CONSTRUCTION PLANS FOR

GOOSE CREEK SEWER PUMP STATION

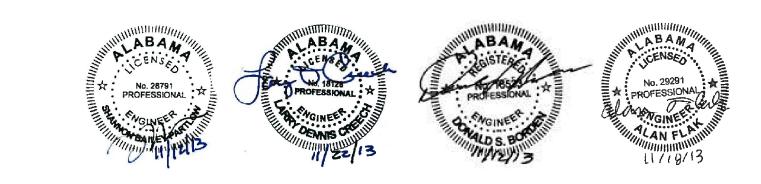
FOR THE

CITY OF HUNTSVILLE DEPARTMENT OF WATER POLLUTION CONTROL CITY PROJECT NO. 65-

HUNTSVILLE, ALABAMA November 2013







GRAVITY SEWER (UNDER SEP. CONTRACT) ► PROPOSED CITY OF HUNTSVILLE GOOSE CREEK PUMP STATION BM (REBAR IN ROW) EL.603.32 N 1501532.3453 E 469446.4126 -FORCEMAIN (UNDER SEP. CONTRACT)

PROJECT LOCATION MAP

APPROX. SCALE: 1" - 400"

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COVER SHEET

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NOTICE TO CONTRACTOR

ALL EVIDENT EXISTING UTILITIES ARE SHOWN. HOWEVER, IT IS
THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY EXACT SIZES
AND LOCATIONS OF ALL EXISTING UTILITIES BEFORE INITIATING
ANY CONSTRUCTION OPERATIONS. ANY EXISTING STRUCTURE, PIPING
OR UTILITY DISTURBED OR DAMAGED BY THE CONTRACTOR DURING
CONSTRUCTION OPERATIONS SHALL BE REPLACED BY THE CONTRACTOR
AT NO ADDITIONAL COST TO THE OWNER AND/OR ENGINEER. THE
CONTRACTOR SHALL CALL:

ALABAMA LINE LOCATION CENTER, INC.
1-800-292-8525
AND
HUNTSVILLE UTILITIES
1-256-882-8255

TWO (2) DAYS BEFORE ANY EXCAVATION ON THIS PROJECT.

Www.tetratech.com

ABAM No. 28791 PROFESSIONAL NO. 28791 PROFESSIONAL						
ВУ						
NO						

SE CREEK PUMP STATION

JECT LOCATION MAP

INDEX OF DRAWINGS

GOOSE CREE

PROJECT I

Project No.: 07106

Designed By: AOT

Drawn By: SDG

Checked By: MDS

G-1

GENERAL NOTES

- 1. THE INTENT OF THE DRAWINGS IS THAT THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND TRANSPORTATION NECESSARY FOR THE PROPER EXECUTION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ALL INCIDENTAL WORK NECESSARY TO COMPLETE THE PROJECT IN AN ACCEPTABLE MANNER, READY FOR USE, OCCUPANCY, OR OPERATION BY THE OWNER.
- 2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO WORK ALL APPLICABLE DRAWINGS AND THE APPROPRIATE SPECIFICATIONS AS A UNIT. ANY OMISSIONS, DELETIONS, OR CONFLICTS ARISING AS A RESULT OF FAILURE TO INCORPORATE ALL DRAWINGS AND SPECIFICATIONS WHICH APPLY SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER AND/OR ENGINEER.
- 3. EFFORTS HAVE BEEN MADE TO INDICATE LOCATIONS OF EXISTING STRUCTURES, PIPING, UTILITIES AND TOPOGRAPHY. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT SIZES AND LOCATIONS OF ALL EXISTING ITEMS BEFORE INITIATING ANY CONSTRUCTION OPERATIONS. ANY EXISTING STRUCTURE, PIPING, OR UTILITY DISTURBED OR DAMAGED BY THE CONTRACTOR DURING CONSTRUCTION OPERATIONS SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER AND/OR ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COORDINATION ACTIVITIES WITH THE OWNER OF ANY FACILITY DISTURBED OR PLANNED TO BE DISTURBED.
- 4. THE CONTRACTOR SHALL COORDINATE IN ADVANCE AND DURING CONSTRUCTION OPERATIONS WITH THE OWNER OF ANY FIBER OPTIC COMMUNICATION CABLES IN THE AREAS WHERE THESE UTILITIES EXIST.
- 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL LINES AND GRADES REQUIRED FOR THE CONSTRUCTION OF THE SEWER LINES. HORIZONTAL AND VERTICAL CONTROL POINTS AND TEMPORARY BENCHMARKS HAVE BEEN PROVIDED BY THE ENGINEER AND ARE SHOWN ON THESE DRAWINGS.
- 6. THE CONTRACTOR SHALL VERIFY ALL HORIZONTAL AND VERTICAL BENCHMARKS SHOWN. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY CONFLICTS.
- 7. THE CONTRACTOR SHALL VERIFY COORDINATES AND ELEVATIONS OF ALL EXISTING STRUCTURES SHOWN ON THESE PLANS. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY CONFLICTS.
- 8. DIMENSIONS OF EXISTING STRUCTURES AND/OR SIZE RESTRICTIONS ARE APPROXIMATE. ALL NECESSARY DIMENSIONS AND ELEVATIONS OF EXISTING STRUCTURES AND TOPOGRAPHY SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD PRIOR TO CONSTRUCTION OPERATIONS.
- 9. THE LIMITS OF CONSTRUCTION SHALL BE THE PROPERTY, RIGHT-OF-WAY, OR EASEMENT LINES AS SHOWN ON THE PLANS. ANY ADDITIONAL EASEMENTS REQUIRED FOR CONSTRUCTION SHALL BE ACQUIRED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER AND/OR ENGINEER.
- 10. EXISTING GRADING AND DRAINAGE ELEVATIONS AND ALL EXISTING CONDITIONS SHALL BE MAINTAINED AFTER ALL APPLICABLE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF HUNTSVILLE ENGINEERING DEPARTMENT'S "DESIGN AND ACCEPTANCE MANUAL FOR SANITARY SEWERS", LATEST EDITION.
- 11. ALL APPLICABLE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF HUNTSVILLE ENGINEERING DEPARTMENT'S "DESIGN AND ACCEPTANCE MANUAL FOR WASTEWATER PUMP STATIONS", LATEST EDITION.
- 12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE NPDES STORMWATER PERMITS DURING THE ENTIRE CONSTRUCTION PERIOD. A COPY OF ALL APPLICABLE PERMITS SHALL BE MAINTAINED ON SITE AT ALL TIMES.
- 13. THE CONTRACTOR SHALL MAINATAIN COPY OF ALDOT APPROVED SPECS. AND PERMIT ON SITE THROUGHOUT CONSTRUCTION.
- 14. THE CONTRACTOR SHALL PROVIDE THE CITY ENGINEER WITH A COMPLETE SET OF RECORD DRAWINGS (AS-BUILTS) IN DIGITAL MICROSTATION (.DGN) AND HARDCOPY FORMAT, AND THE CONTRACTOR/INSPECTOR RED-LINED DRAWINGS UPON COMPLETION OF CONSTRUCTION. DRAWINGS SHALL BE REFERENCED TO THE ALABAMA STATE PLANE COORDINATE SYSTEM, NAD83 ALABAMA, AS DESCRIBED IN THE APPLICABLE SECTION OF THE "CODE OF ALABAMA" (1975). SURVEYS SHALL BE TIED TO A MINIMUM OF TWO ACCEPTED GPS MONUMENTS OR ONE GPS TIE POINT PLUS AN ASTRONOMIC OBSERVATION TO DETERMINE GRID NORTH. THE SURVEY SHALL BE COMPLETED BY A LAND SURVEYOR LICENSED IN THE STATE OF ALABAMA. IN ADDITION, THE RECORD DRAWINGS SHALL SHOW FINAL VERTICAL AND HORIZONTAL ALIGNMENT OF ALL BURIED UTILITIES ADDED OR MOVED AS A RESULT OF CONSTRUCTION. THEY SHALL INCLUDE ALL LINES, ACTUAL FIELD ANGLES BETWEEN LINES, SERVICE LINES AND TEE LOCATIONS, VALVE VAULTS AND VALVE BOXES, AND STUBOUTS. THEY SHALL REFLECT ALL ALIGNMENT AND GRADE CHANGES FROM THE DESIGN DRAWINGS MADE DURING CONSTRUCTION. RECORD DRAWINGS MUST BE COMPLETED AND SUBMITTED PRIOR TO ACCEPTANCE OF THE SEWERS INTO THE PUBLIC SYSTEM AND ANY CONNECTIONS BEING MADE THERETO.
- 15. THE CONTRACTOR SHALL BE TOTALLY RESPONSIBLE FOR TVI, VACUUM TESTING MANHOLES, AND AIR TESTING SEWER LINES. A 72-HOUR NOTICE IS REQUIRED PRIOR TO ALL TESTING PROCEDURES. REPRESENTATIVES FROM BOTH THE CITY ENGINEERING OFFICE AND WATER POLLUTION CONTROL SHALL BE PRESENT TO VERIFY TESTING RESULTS.
- 16. TRAFFIC CONTROL SHALL BE MAINTAINED IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". LATEST
- 17. ALL CONCRETE AND ASPHALT DRIVEWAYS AND OTHER ROAD ACCESSES SHALL BE SAWCUT AND REPAIRED IN AS GOOD OR BETTER CONDITION AS BEFORE CONSTRUCTION. PROPERTY OWNERS SHALL HAVE ACCESS TO PROPERTY AT ALL TIMES DURING CONSTRUCTION.
- 18. THE CONTRACTOR SHALL MAINTAIN A 15' MINIMUM EXCAVATION CLEARANCE AT ALL TRANSMISSION LINE TOWER SUPPORTS AND DOWN GUY ANCHORS.
- 19. MAILBOXES MAY BE REMOVED FOR CONSTRUCTION PURPOSES ONLY. MAILBOXES SHALL BE REINSTALLED IN THEIR ORIGINAL POSITIONS AND IN AS GOOD OR BETTER CONDITION THAN PRIOR TO CONSTRUCTION. IF MAILBOXES ARE TO BE REMOVED FOR CONSTRUCTION PURPOSES, THE MAILBOXES SHALL BE REPLACED BEFORE THE END OF THE WORKING DAY.
- 20. FENCING MAY BE REMOVED FOR CONSTRUCTION PURPOSES ONLY. FENCES SHALL BE REINSTALLED IN THEIR ORIGINAL POSITIONS AND IN AS GOOD OR BETTER CONDITION THAN PRIOR TO CONSTRUCTION.
- 21. IF THE REQUIRED DISTANCE TO USE RESTRAINED JOINT PIPING FALLS BETWEEN TWO JOINTS, THE CONTRACTOR SHALL TO USE RESTRAINED JOINT PIPING ON THE NEXT JOINT GREATER THAN THE DISTANCE SPECIFIED.
- 22. ALL BURIED PIPES SHALL HAVE A MINIMUM OF 3'-O" COVER AS MEASURED VERTICALLY FROM FINISHED GRADE TO THE TOP OF PIPE, UNLESS OTHERWISE NOTED.
- 23. SERVICE LATERALS AND STUBOUTS SHALL BE EXTENDED TO PROPERTY OR EASEMENT LINES AS SHOWN ON PLANS.
- 24. THE CONTRACTOR SHALL SUPPLY AND INSTALL CLEANOUTS, SERVICE CONNECTIONS, AND FLEX CONNECTIONS IN MANHOLES AT ELEVATIONS AND DEFLECTIONS AS NOTED ON PLANS FOR ALL SERVICE LATERALS SHOWN.
- 25. ENTIRE FORCEMAIN MUST PASS ALL TESTS PRIOR TO CONNECTION TO EITHER END.
- 26. BEST MANAGEMENT PRACTICES AND SEDIMENT AND EROSION CONTROL METHODS SHALL BE MAINTAINED THROUGHOUT PROJECT. THE SEDIMENT AND EROSION CONTROL METHODS SHOWN ON THESE PLANS ARE MEANT TO BE A GUIDE AND ARE ONLY MINIMUM REQUIREMENTS. THE OWNER MAY REQUIRE ADDITIONAL SEDIMENT AND EROSION CONTROL DURING THE CONSTRUCTION PERIOD IF NECESSARY. ALL SEDIMENT AND EROSION CONTROL METHODS SHALL BE INSTALLED AND MAINTAINED ACCORDING TO THESE DRAWINGS, THE TECHNICAL SPECIFICATIONS, AND THE NPDES PERMIT.
- 27. THE CONTRACTOR SHALL INSTALL SILT FENCE ALONG THE DOWNHILL SIDE OF ALL DISTURBED AREAS AND TAKE ALL NECESSARY EFFORTS TO MINIMIZE SEDIMENTATION AT ALL CREEK CROSSINGS.
- 28. SEED. FERTILIZE, AND MULCH ALL AREAS DISTURBED DURING CONSTRUCTION. VEGETATIVE COVER SHALL BE RE-ESTABLISHED AS SOON AS POSSIBLE AFTER LAND DISTURBANCE.
- 29. TOPSOIL IN AREAS OF EXCAVATION SHALL BE STRIPPED AND SEPARATELY STOCKPILED ON SITE FOR FINISH LANDSCAPING AND/OR GRADING USE ONLY.
- 30. A SUBSURFACE INVESTIGATION FOR THIS PROJECT WAS CONDUCTED BY OMI, INC. OF HUNTSVILLE, AL. A COPY OF THE REPORT IS ATTACHED AS AN APPENDIX TO THE SPECIFICATIONS. THE BORING RESULTS AND CONCLUSIONS PRESENTED IN THE REPORT REPRESENT THE WORK OF OMI, INC. AS AN INDEPENDENT CONTRACTOR. THE REPORT IS PROVIDED FOR INFORMATION ONLY AND SHALL NOT BE CONSTRUED IN ANY FASHION AS HAVING BEEN APPROVED BY THE CITY OF HUNTSVILLE OR TETRA TECH, INC. ALL EXCAVATION WORK SHALL BE UNCLASSIFIED AND ANY FINDINGS SHOWN BY THE GEOTECHNICAL REPORT SHALL NOT BE USED TO CLASSIFY EXCAVATION WORK. CONSTRUCTION UNLESS OTHERWISE SHOWN ON PLANS.
- 31. THE CONTRACTOR IS RESPONSIBLE FOR FOLLOWING ALL APPLICABLE OSHA REGULATIONS.

ABBREVIATIONS

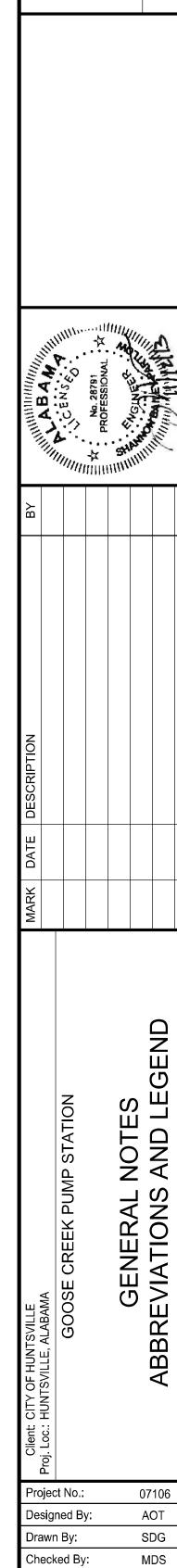
ВМ	BENCH MARK
Q.	CENTERLINE
cō	CLEANOUT
CONC	CONCRETE
CMP	CORRUGATED METAL PIPE
DB	DEED BOOK
DEG.	DEGREE
DIP	DUCTILE IRON PIPE
EL/ELEV	ELEVATION
EX/EXIST	EXISTING
FOC	FIBER OPTIC CABLE
FLG	FLANGE
FM	FORCEMAIN
G	GAS LINE
GUY	GUY WIRE
INFL	INFLUENT
INV	INVERT
LP	LIGHT POLE
MH	MANHOLE
MJ	MECHANICAL JOINT
NIC	NOT IN CONTRACT
OD	OUTSIDE DIAMETER
OHE	OVERHEAD ELECTRIC
PG	PAGE
P _C	PROPERTY LINE
PP	POWER POLE
RCP	REINFORCED CONCRETE PIPE
RJ	RESTRAINED JOINT
R/W	RIGHT OF WAY
STM	STORM SEWER
SHT	SHEET
SAN	SANITARY SEWER
TBM	TEMPORARY BENCH MARK
TP	TELEPHONE POLE
T YP UGT	TYPICAL
	UNDERGROUND TELEPHONE LINE
UNO	UNLESS NOTED OTHERWISE

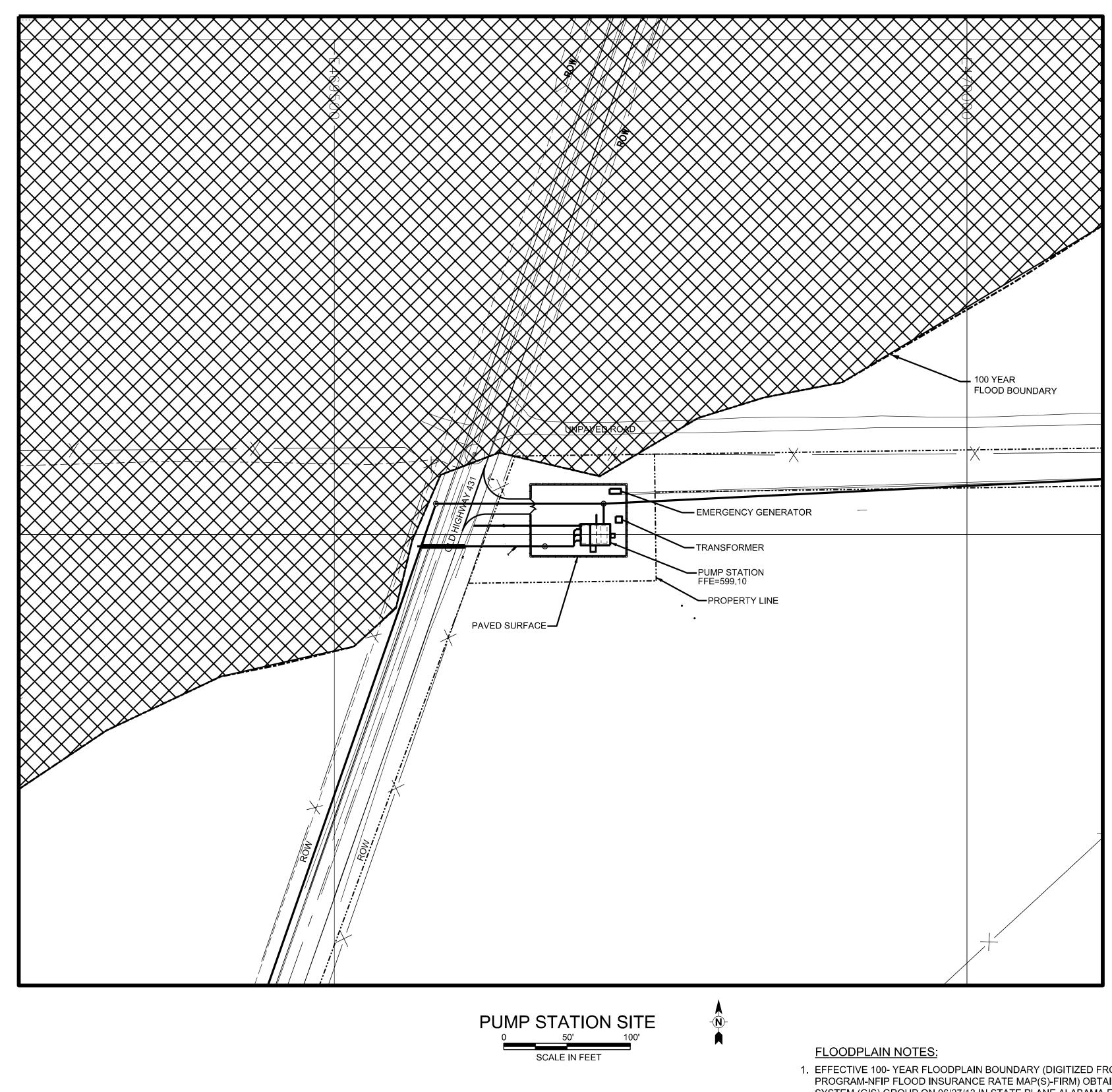
WATER LINE

<u>L</u>	<u>EGEND</u>
•	MANHOLE
	SEWER LINE
— FM —	SEWER FORCEMAIN
	EASEMENT LINE
\odot	EX. MANHOLE
	EX. UTILITY
	EX. FENCE
	EX. EDGE OF GRAVEL/ASPHALT
	EX. EASEMENT LINE
· ₽··	EX. PROPERTY LINE
	HAY BALES
— SF —— SF —	SILT FENCE
	EX. VEGETATION LINE
	WILDLIFE REFUGE LINE
	EX. STRUCTURE
Þ	EX. UTILITY POLE
$\not \longleftrightarrow$	EX. UTILITY POLE WITH GUY WIRE
	EX. CONCRETE MONUMENT FOUND
	EX. IRON PIN FOUND
•	TEMPORARY BENCH MARK
● B − 1	BORE HOLE
Ñ	NORTH ARROW
CP 8	SURVEY CONTROL POINT

ZONE X-F FLOOD ZONE

ZONE AE-FF





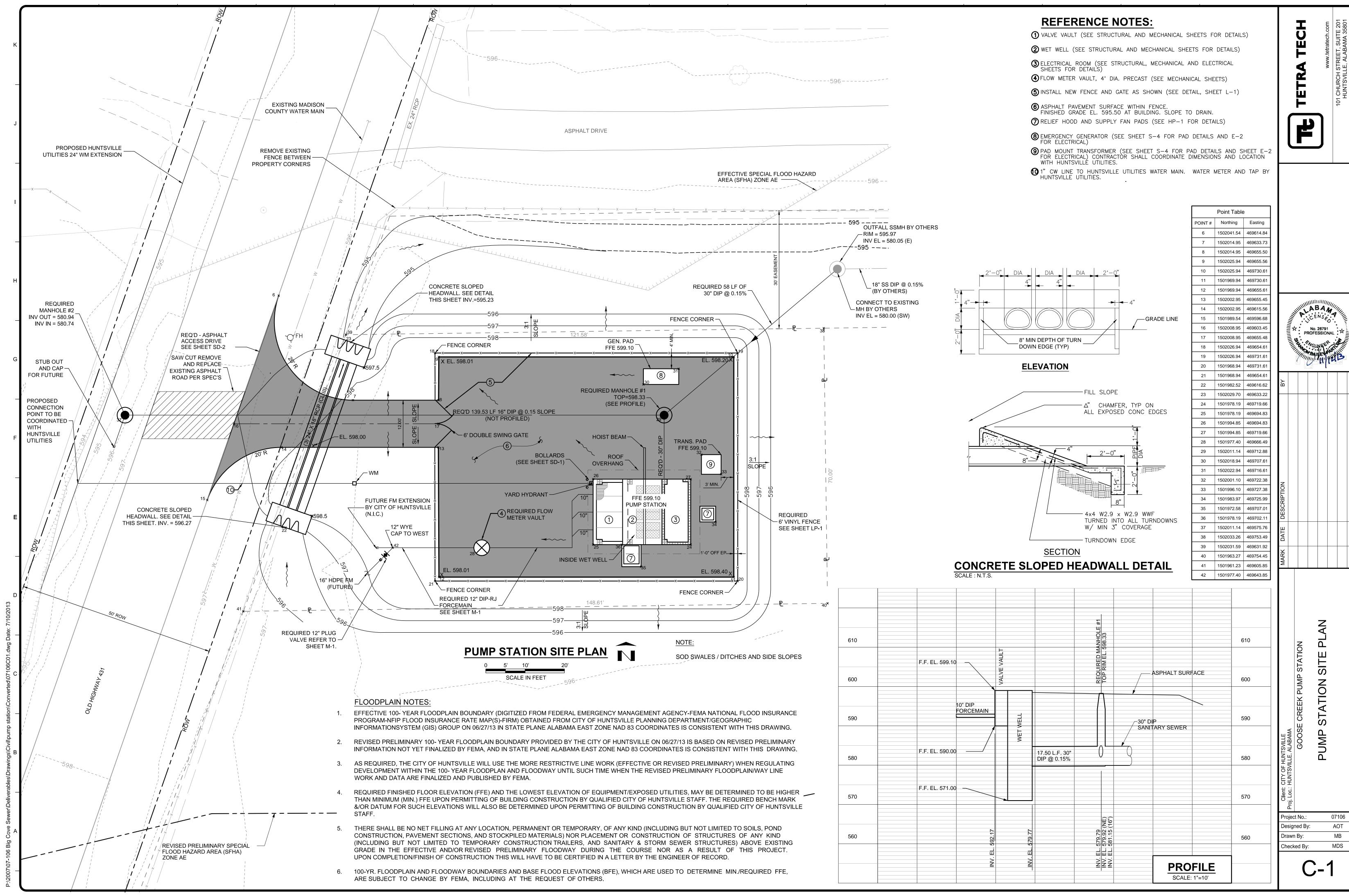
LEGEND:

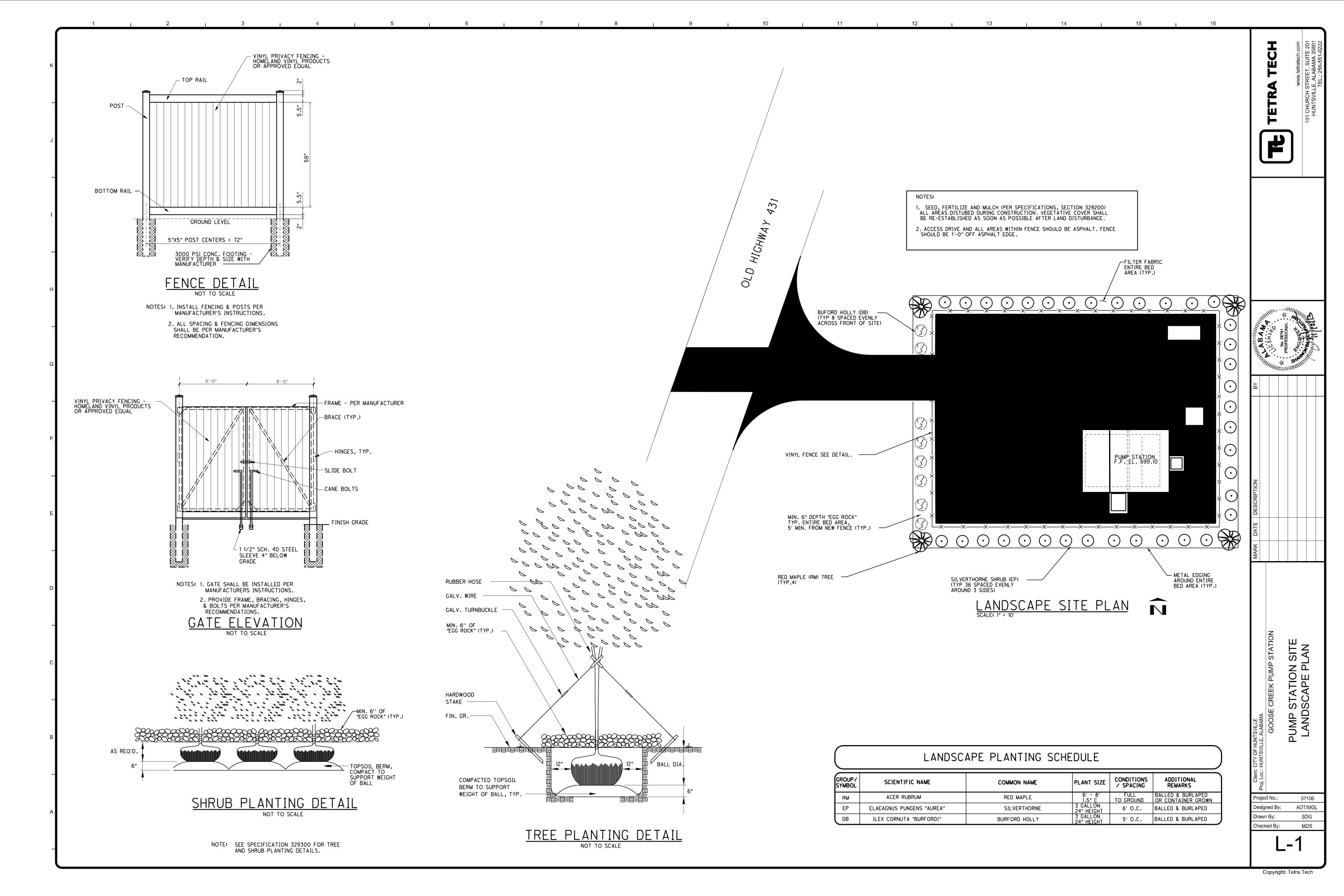
SPECIAL FLOOD HAZARD AREA (SFHA) ZONE AE

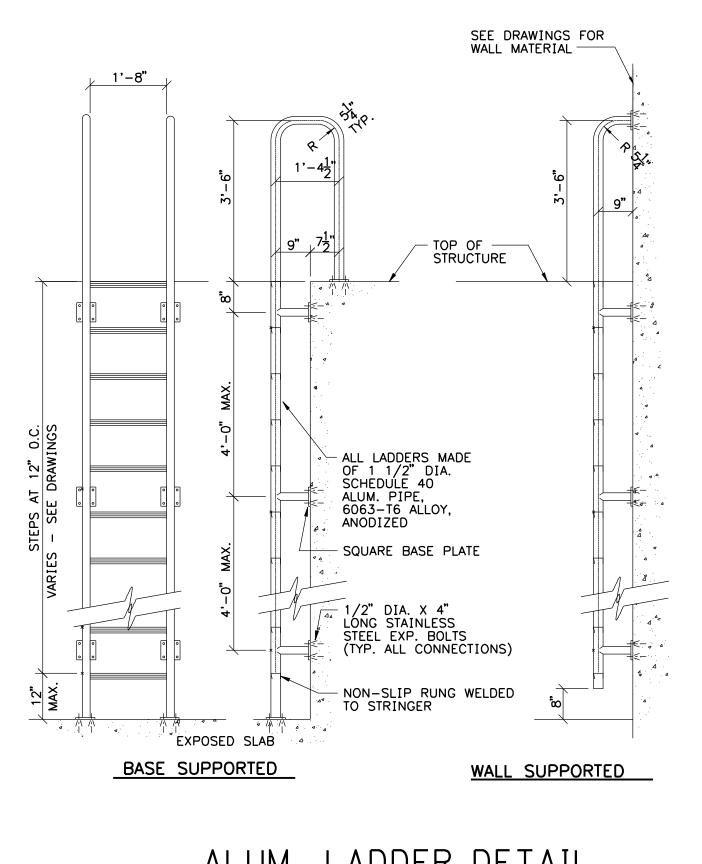
- 1. EFFECTIVE 100- YEAR FLOODPLAIN BOUNDARY (DIGITIZED FROM FEDERAL EMERGENCY MANAGEMENT AGENCY-FEMA NATIONAL FLOOD INSURANCE PROGRAM-NFIP FLOOD INSURANCE RATE MAP(S)-FIRM) OBTAINED FROM CITY OF HUNTSVILLE PLANNING DEPARTMENT/GEOGRAPHIC INFORMATION SYSTEM (GIS) GROUP ON 06/27/13 IN STATE PLANE ALABAMA EAST ZONE NAD 83 COORDINATES IS CONSISTENT WITH THIS DRAWING.
- 2. REVISED PRELIMINARY 100- YEAR FLOODPLAIN BOUNDARY PROVIDED BY THE CITY OF HUNTSVILLE ON 06/27/13 IS BASED ON REVISED PRELIMINARY INFORMATION NOT YET FINALIZED BY FEMA, AND IN STATE PLANE ALABAMA EAST ZONE NAD 83 COORDINATES IS CONSISTENT WITH THIS
- 3. AS REQUIRED, THE CITY OF HUNTSVILLE WILL USE THE MORE RESTRICTIVE LINE WORK (EFFECTIVE OR REVISED PRELIMINARY) WHEN REGULATING DEVELOPMENT WITHIN THE 100- YEAR FLOODPLAN AND FLOODWAY UNTIL SUCH TIME WHEN THE REVISED PRELIMINARY FLOODPLAIN/WAY LINE WORK AND DATA ARE FINALIZED AND PUBLISHED BY FEMA.
- 4. REQUIRED FINISHED FLOOR ELEVATION (FFE) AND THE LOWEST ELEVATION OF EQUIPMENT/EXPOSED UTILITIES, MAY BE DETERMINED TO BE HIGHER THAN MINIMUM (MIN.) FFE UPON PERMITTING OF BUILDING CONSTRUCTION BY QUALIFIED CITY OF HUNTSVILLE STAFF. THE REQUIRED BENCH MARK &/OR DATUM FOR SUCH ELEVATIONS WILL ALSO BE DETERMINED UPON PERMITTING OF BUILDING CONSTRUCTION BY QUALIFIED CITY OF HUNTSVILLE STAFF.
- 5. THERE SHALL BE NO NET FILLING AT ANY LOCATION, PERMANENT OR TEMPORARY, OF ANY KIND (INCLUDING BUT NOT LIMITED TO SOILS, POND CONSTRUCTION, PAVEMENT SECTIONS, AND STOCKPILED MATERIALS) NOR PLACEMENT OR CONSTRUCTION OF STRUCTURES OF ANY KIND (INCLUDING BUT NOT LIMITED TO TEMPORARY CONSTRUCTION TRAILERS, AND SANITARY & STORM SEWER STRUCTURES) ABOVE EXISTING GRADE IN THE EFFECTIVE AND/OR REVISED PRELIMINARY FLOODWAY DURING THE COURSE NOR AS A RESULT OF THIS PROJECT. UPON COMPLETION/FINISH OF CONSTRUCTION THIS WILL HAVE TO BE CERTIFIED IN A LETTER BY THE ENGINEER OF RECORD.
- 6. 100-YR. FLOODPLAIN AND FLOODWAY BOUNDARIES AND BASE FLOOD ELEVATIONS (BFE), WHICH ARE USED TO DETERMINE MIN./REQUIRED FFE, ARE SUBJECT TO CHANGE BY FEMA, INCLUDING AT THE REQUEST OF OTHERS.



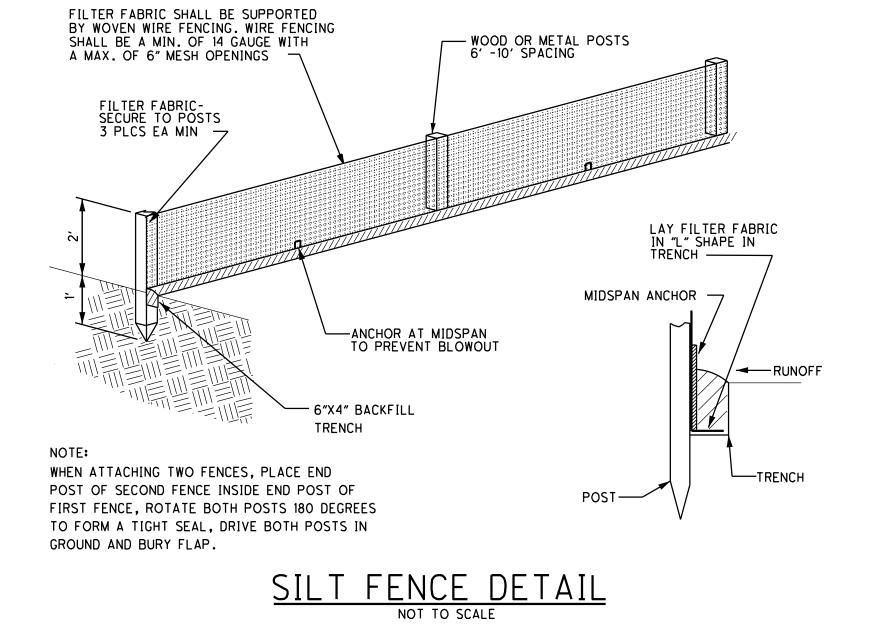
Project No 07106 AOT Designed By: Drawn By: Checked By:

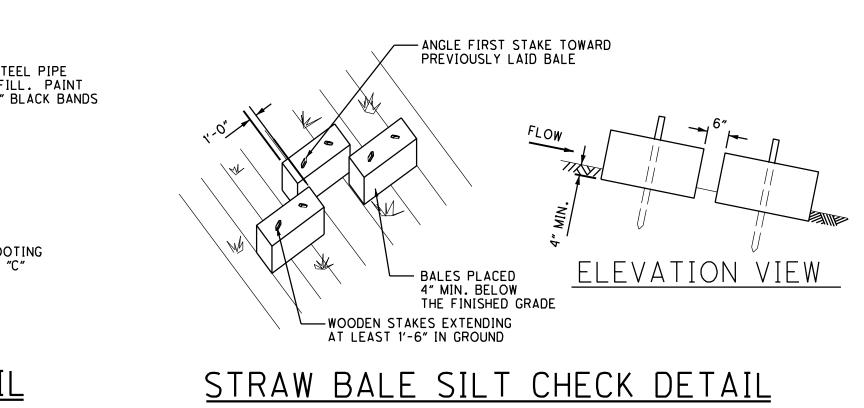


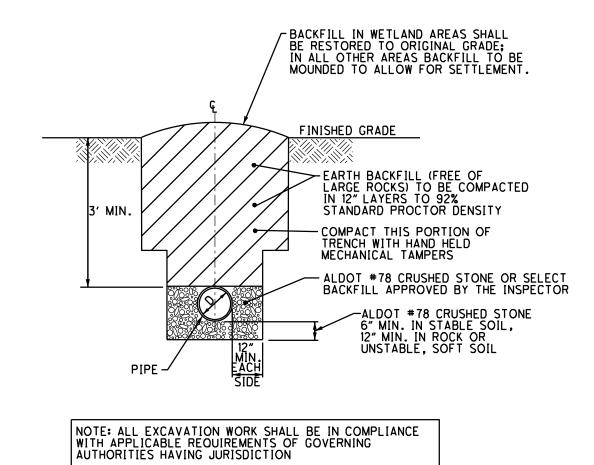


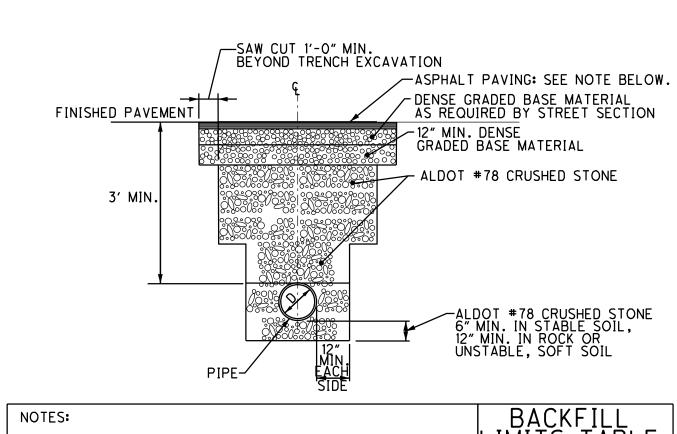


ALUM. LADDER DETAIL NOT TO SCALE









	1.ALL EXCAVATION WORK SHALL BE IN COMPLIANCE WITH APPLICABLE REQUIREMENTS OF GOVERNING	LIMITS	TABLE INSIDE	
	AUTHORITIES HAVING JURISDICTION.	ALLOWABLE	DIAMETER	
	2.TRAFFIC AREAS TO EXTEND 5 FT BEYOND BACK OF	TRENCH WIDTH	OF PIPE "D"	
	CURB OR EDGE OF PAVEMENT, UNLESS OTHERWISE NOTED ON PLAN VIEW.	2'-6"	4"	
	NOTED ON FLAN VIEW.	2′-8″	6"	
	3.STEEL ENCASEMENT SHALL BE USED UNDER ROADWAYS	2'-10"	8″	
	WHERE SPECIFIED.	3'-0"	10"	
		3′-5″	12"	
		3′-9″	15"	
		4'-1"	18"	
		4'-4"	21"	
		4'-8"	24"	
		5'-1"	27"	
$\supset I \subset$	AL TOUNCH DETAIL FOR	5′-5″	30"	
J l L	AL TRENCH DETAIL FOR	5′-10″	33"	
		6′-2″	36"	
$\sim \Delta$	NITARY SEWER PIPE	6′-8″	39"	
<u> </u>		6'-11"	42"	
	IN TRAFFIC AREAS	7′-6″	48"	
	IN INALLIC ANLAS	D+2†+2′-8"	OVER 48"	
	NOT TO SCALE IF "W"	S EXCEEDED, THE C BE RESPONSIBLE FO	ONTRACTOR	
	SHALL	BE RESPONSIBLE FO	R ADDITIONAL	L
	OTHERN	OF CRUSHED STONE, VISE APPROVED BY	CITY ENGINEER	RING.

<u>TYP</u>

Proj	
Project No.:	07106
Designed By:	AOT/MGL
Drawn By:	SDG
Checked By:	MDS

DETAILS

STANDARD

SD-1

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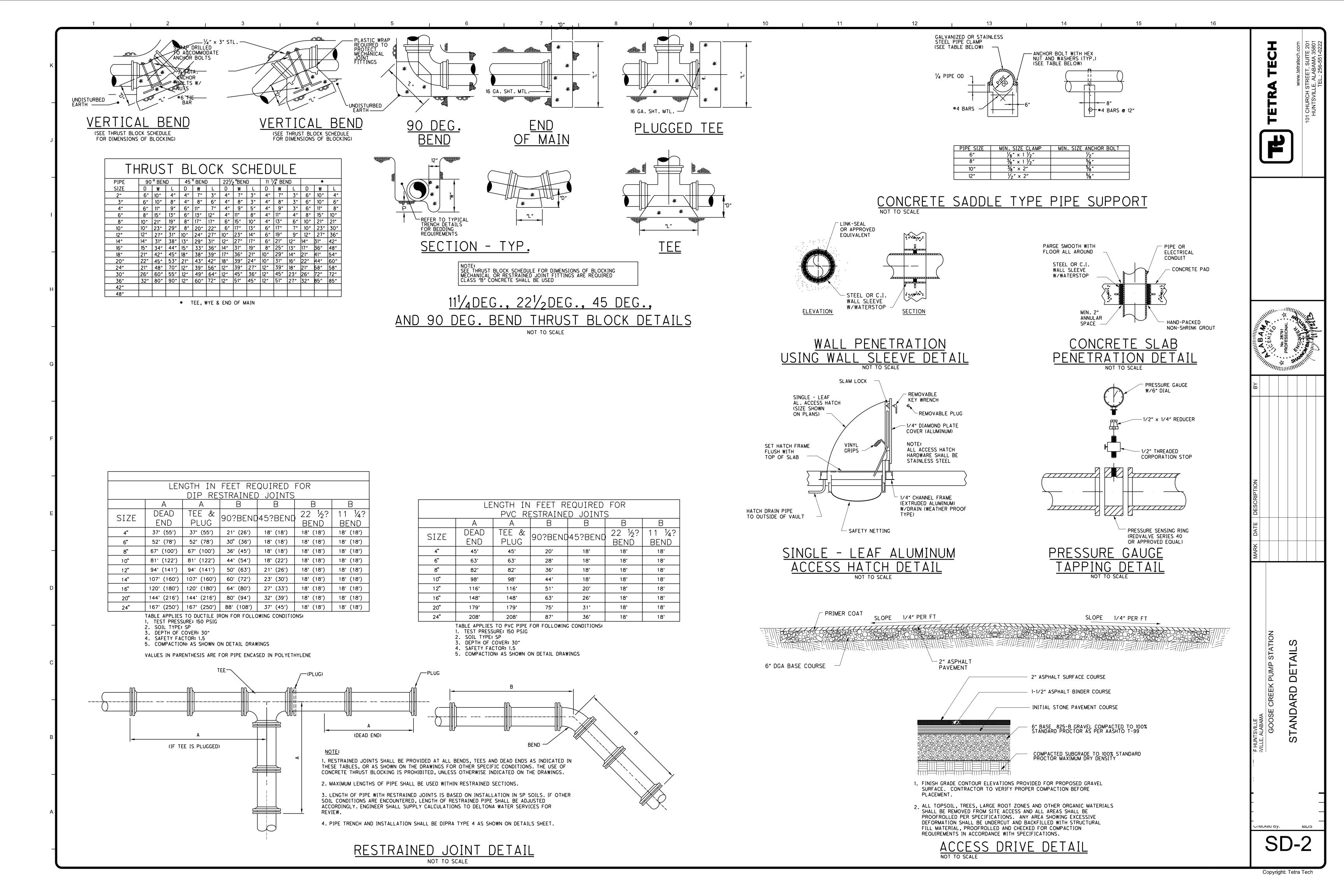
6" GALVANIZED STEEL PIPE
WITH CONCRETE FILL. PAINT
ORANGE W/2 - 4" BLACK BANDS

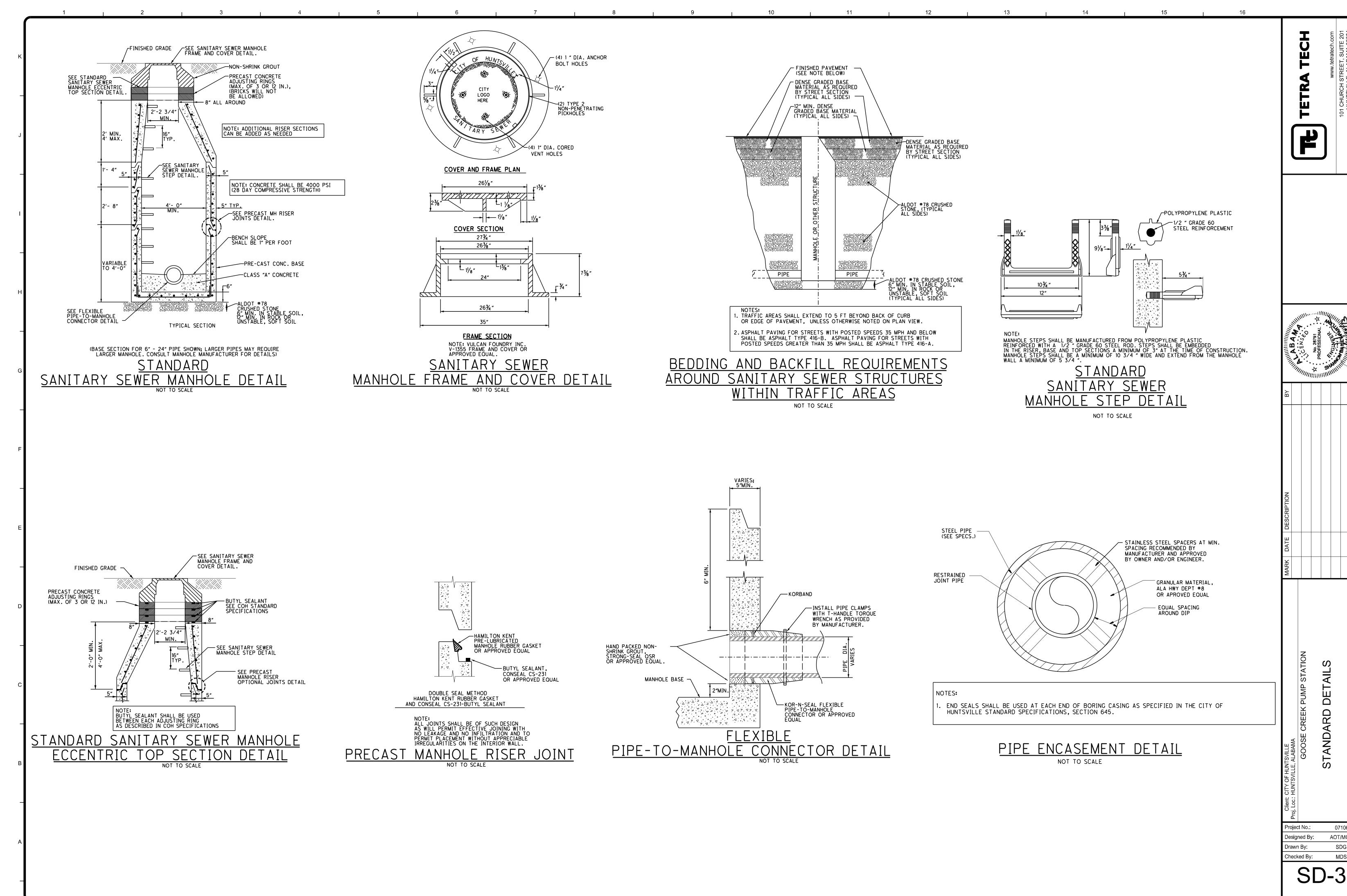
SLOPE 1"

CONCRETE FOOTING
TO BE CLASS "C"
CONCRETE

BOLLARD DETAIL NOT TO SCALE

STRAW BALE SILT CHECK DETAIL





07106 AOT/MGL

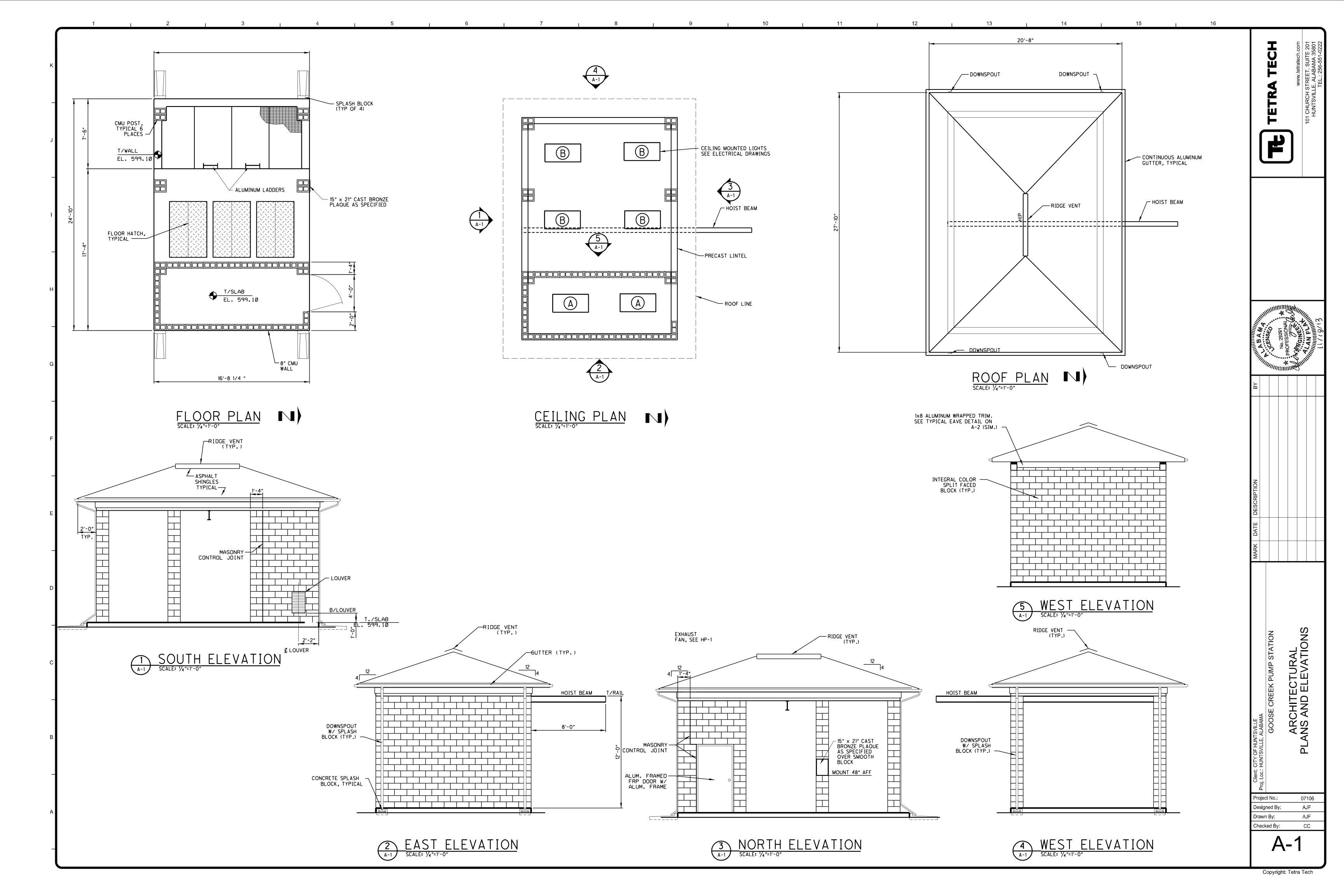
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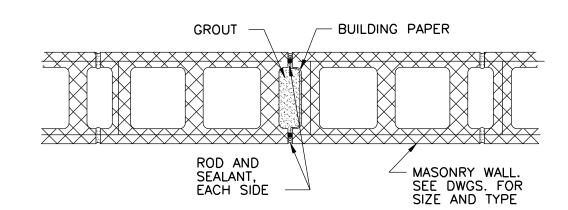
MDS

AIL

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TANDARD

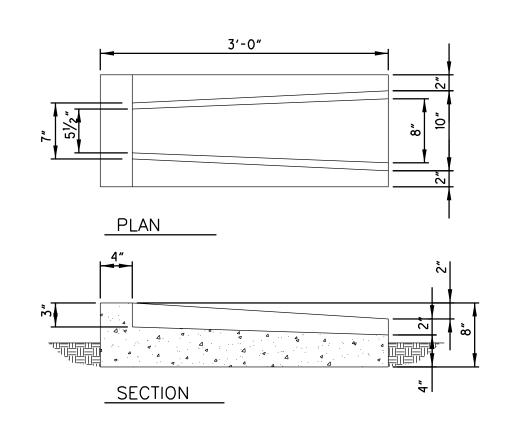




SINGLE WYTHE

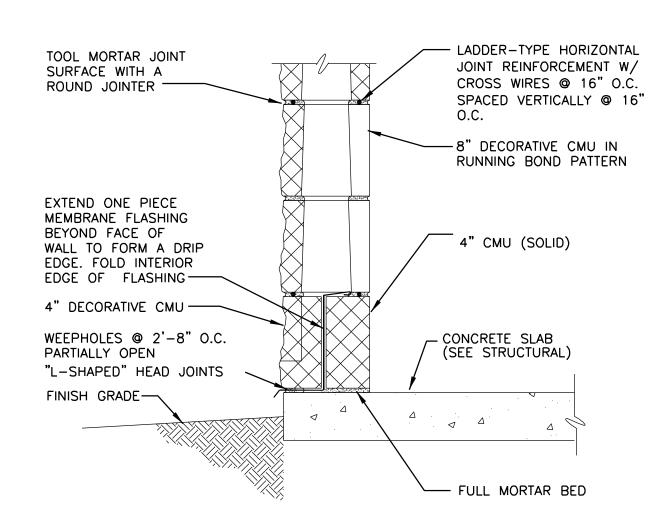
TYPICAL CONTROL JOINT DETAIL

SCALE: NONE

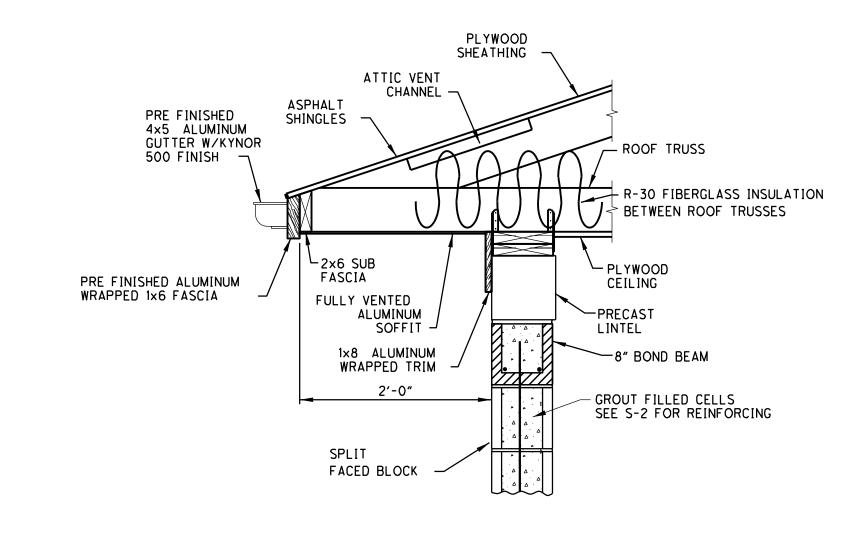


SPLASH BLOCK DETAIL

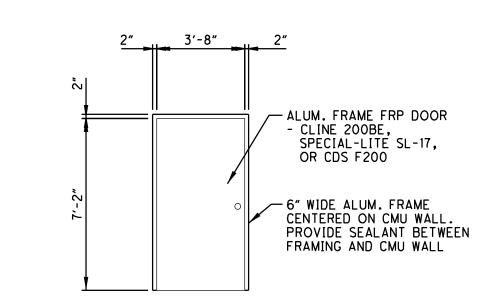
SCALE: 1" = 1'-0"



SINGLE WYTHE FLASHING DETAIL SCALE: 11/2" = 1'-0"



TYPICAL EAVE DETAIL
SCALE: 1"=1'-0"



FRP DOOR (LHR) WITH CONT. GEAR HINGE, WEATHER STRIPPING, CLOSER, LOCK SET WITH LEVER HANDLE (PUSH BUTTON LOCK INSIDE), AND THRESHOLD (SET IN BED OF MASTIC). SEE HARDWARE SCHEDULE IN SPECIFICATIONS.

DOOR DETAIL
SCALE: 1/4"=1'-0"

ARCHITECTURAL STANDARD DETAILS

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A-2

07106

AJF

AJF

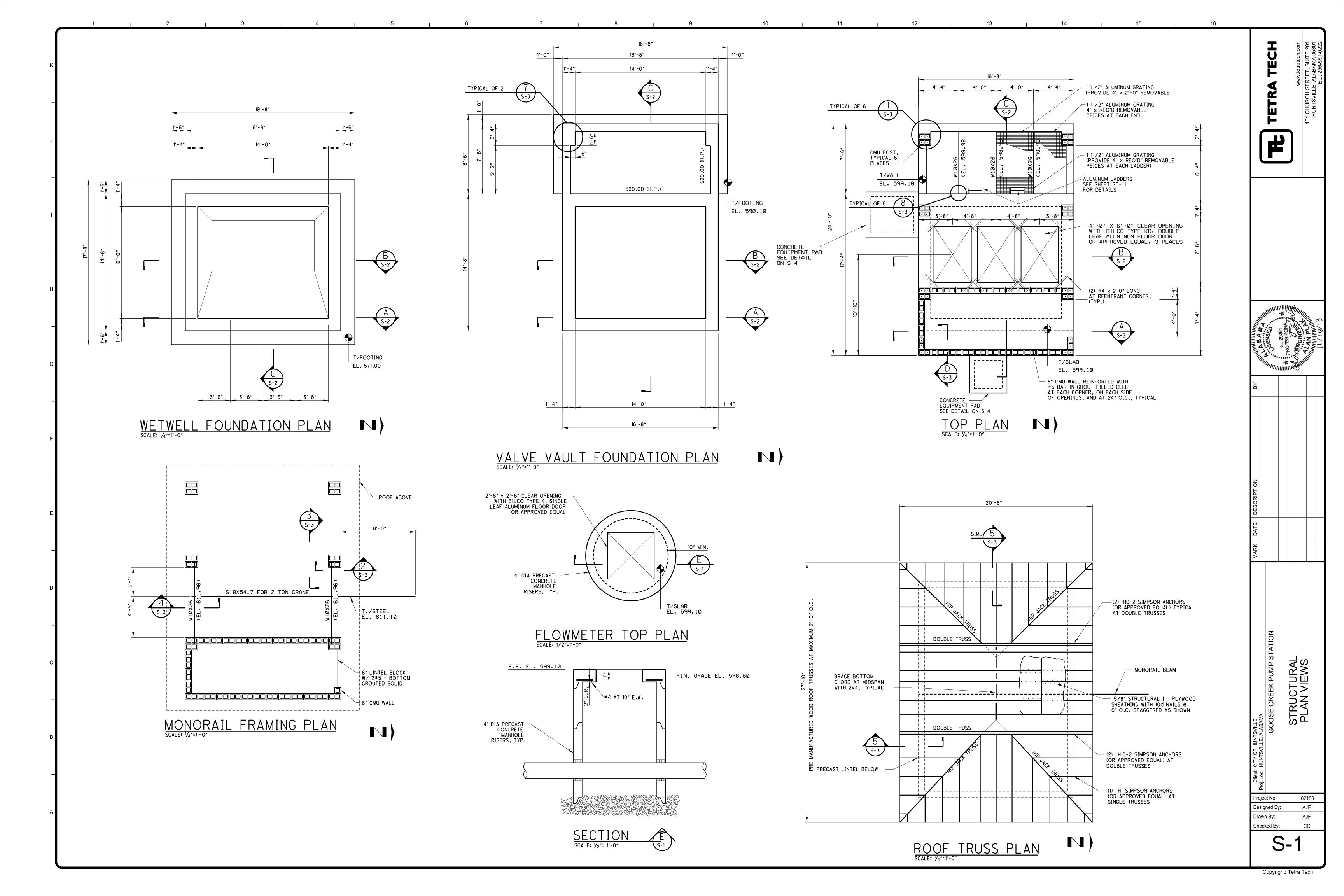
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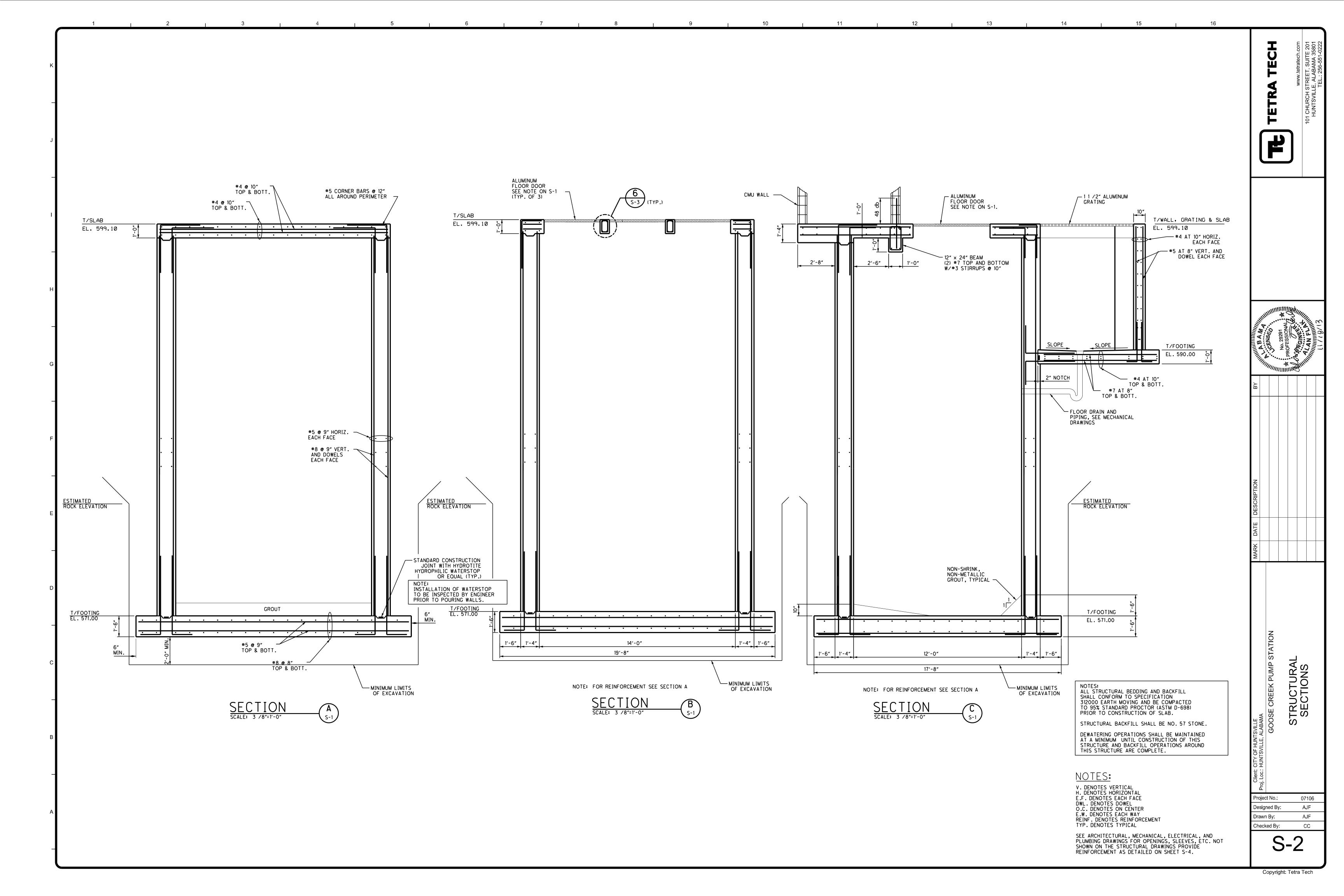
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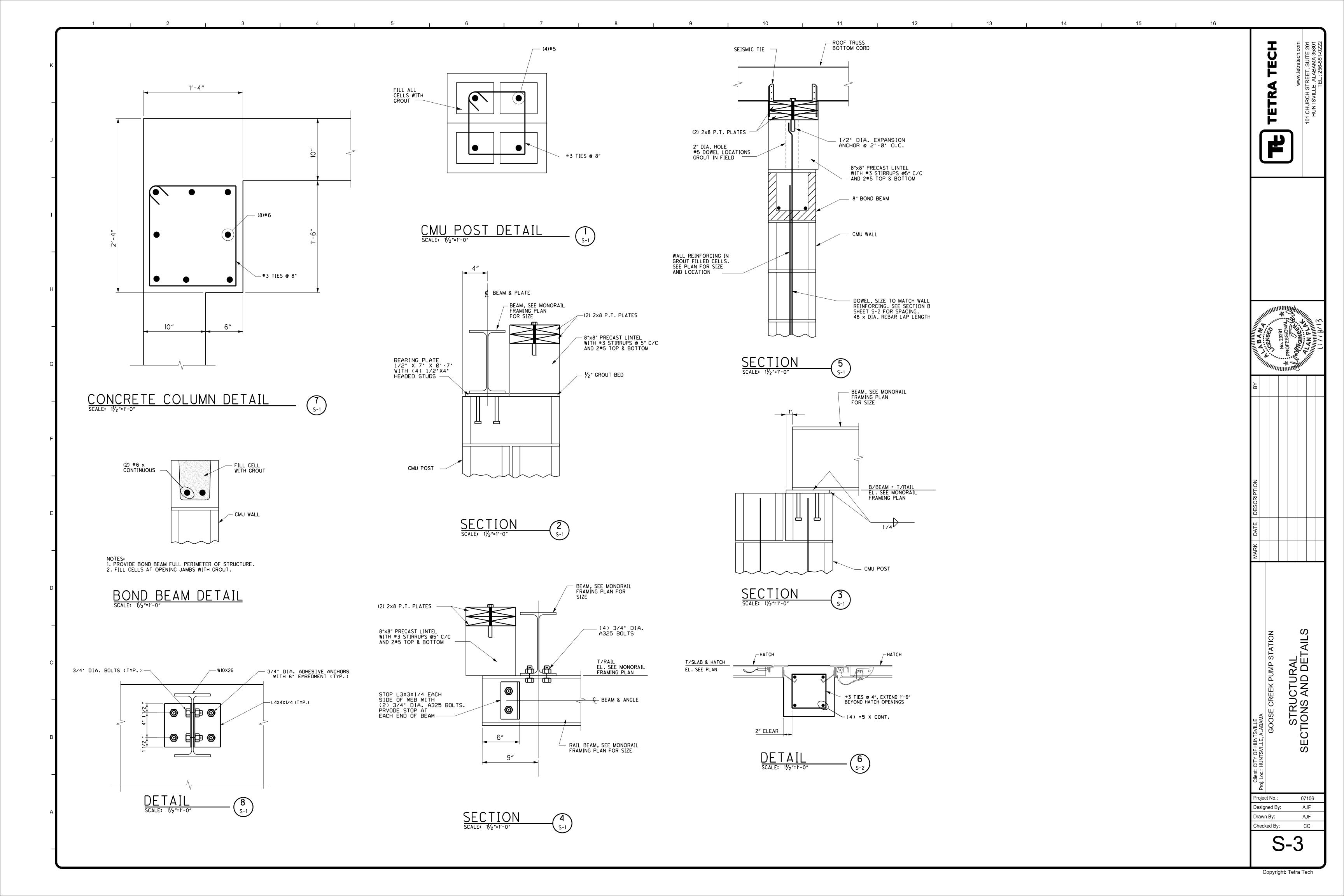
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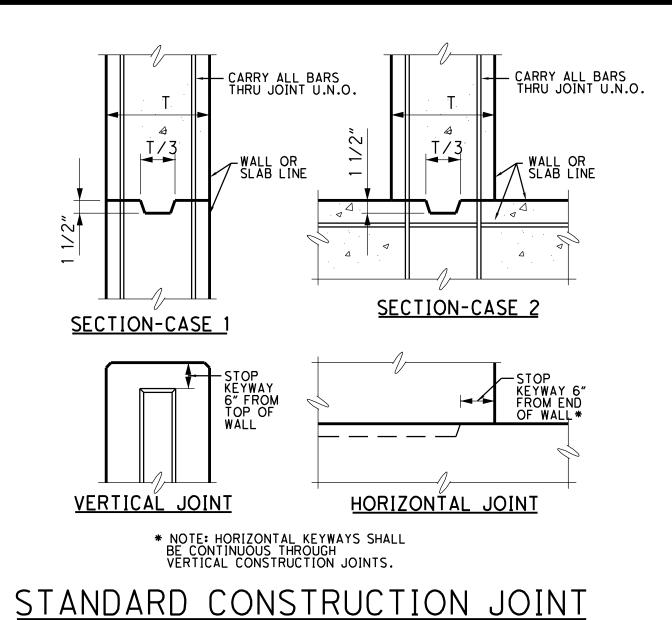
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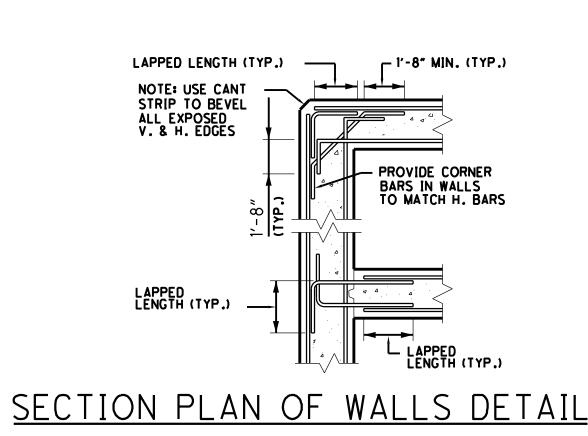
Checked By:











REINFORCING TENSION
SPLICE TABLE

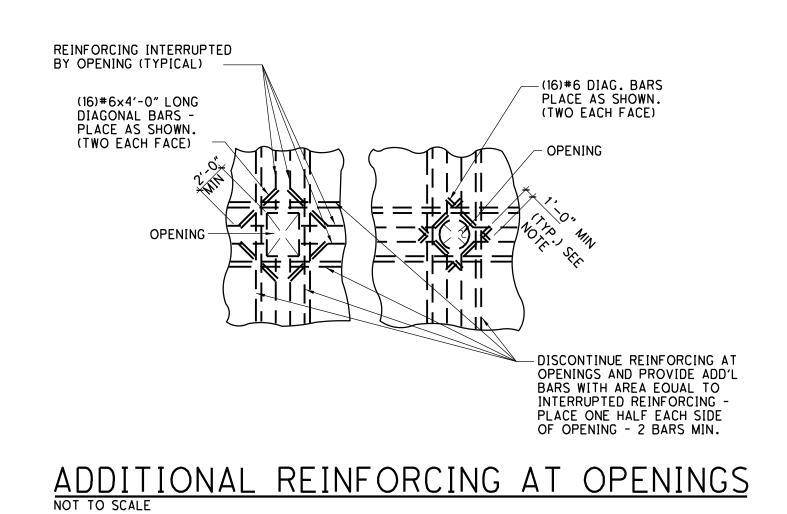
FOR f'c=4000 PSI CONCRETE WITH 2" (MINIMUM) COVER TO MAIN REINFORCING BARS

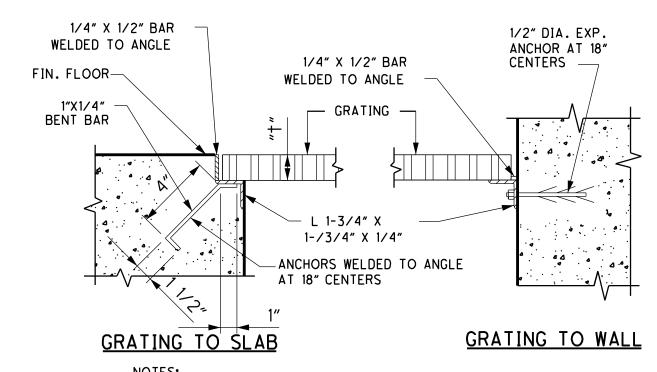
BAR SIZE	TENSION LAP LENGTH	* TOP BARS
#3	16"	22"
#4	20"	29"
# 5	24"	36"
#6	28"	43"
#7	42"	63"
#8	48"	72"
#9	54"	81"
#10	61"	91"
#11	67"	101"

1. ALL SPLICES SHALL BE CONSIDERED TENSION SPLICES USING LAP LENGTHS IN TABLE ABOVE UNLESS SPECIFICALLY SHOWN OTHERWISE ON THE DRAWINGS.

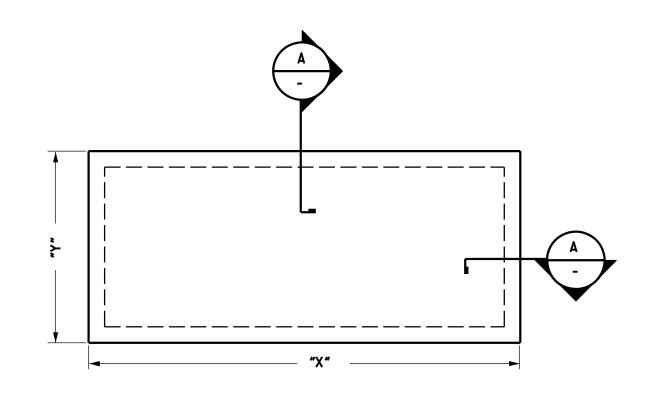
- LENGTHS ARE BASED ON LAP CLASS B SPLICES WITH CENTER TO CENTER SPACING OF BARS GREATER THAN 6 DIAMETERS.
- * 3. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST UNDER THEM. 4. FOR SPLICES OF DIFFERENT SIZE BARS, THE SPLICE DIMENSIONS OF THE SMALLER

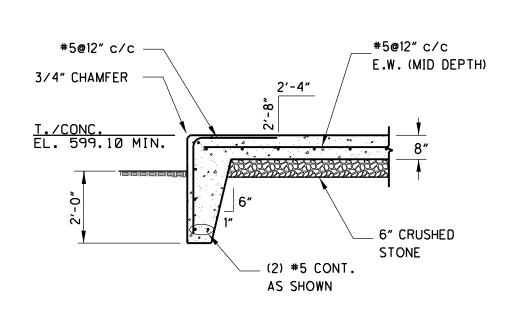
BAR SHALL BE USED.





- 1. GRATING MATERIAL AND THICKNESS "T" TO BE AS
- 2. ALL FRAMES AND ACCESSORIES TO BE GALVANIZED AS SHOWN, UNLESS OTHERWISE SPECIFIED (U.N.O.).
- 3. 1/2" DIA X 4" LONG HEADED STUDS MAY BE USED IN LIEU BENT BAR SHOWN. 4. FOR FRP GRATING, FRP FRAMES MAY BE USED IN
- LIEU OF DETAILS SHOWN.
- FRAMES FOR GRATING OPENINGS DETAIL

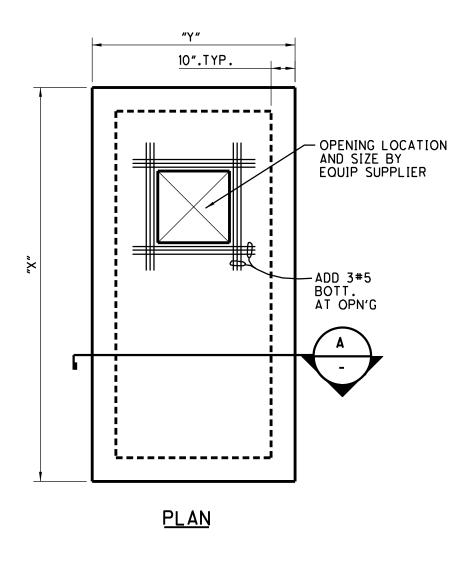


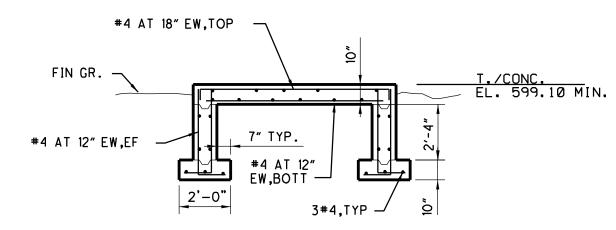




CONCRETE EQUIPMENT AND GENERATOR PAD NOT TO SCALE

NOTE: PAD DIMENSIONS TO BE DETERMINED BY EQUIPMENT MANUFACTURER.





SECTION A-A

TRANSFORMER PAD NOTE: COORDINATE EXACT PAD REQUIREMENTS WITH UTILITY COMPANY.

DESIGN CRITERIA

BUILDING CODE: 2012 INTERNATIONAL BUILDING CODE
DEAD LOADS:
ROOFS
ROOFS
CONCRETE TOP SLAB AND GRATING 100 PSF SNOW LOAD:
GROUND SNOW LOAD (PG) 10 PSF FLAT ROOF SNOW LOAD (PF) 5.6PSF
FLAT ROOF SNOW LOAD (PF) 5.6PSF SNOW EXPOSURE FACTOR (CE) 0.8
SNOW LOAD IMPORTANCE FACTOR 1.0
THERMAL FACTOR 1.0
WIND LOAD: BASIC WIND SPEED (3-SECOND GUST) 90 MPH
EXPOSURE CATEGORY D
IMPORTANCE FACTOR (IW)
COMPONENTS AND CLADDING WIND PRESSURE 40 PSF
SEISMIC LOAD: SEISMIC OCCUPANCY CATEGORY (TABLE 1604.5) II
SPECTRAL RESPONSE ACCELERATIONS:
SS 0.305 S1 0.108
ODEOTDAL DECOMME COFFEIGIENTO
SPECTRAL RESPONSE CUEFFICIENTS: SDS 0.203 SD1
SD1 0.072 SEISMIC IMPORTANCE FACTOR (IE) 1.0
SEISMIC DESIGN CATEGORY C
SITE CLASS D BASIC SEISMIC - FORCE - RESISTING SYSTEM:
ORDINARY REINFORCED MASONRY SHEAR WALLS
RESPONSE MODIFICATIONS COEFFICIENT (R) . 2 DESIGN BASE SHEAR:
ABOVE GROUND STRUCTURE 4.1 KIPS
SEISMIC RESPONSE COEFFICIENT (CS) 0.102 ANALYSIS PROCEDURE EQUIVALENT LATERAL FORCE
MATERIALS:
CONCRETE
MASONRY
CMU PRISM TEST
WELDING GALVANIZED STEEL 60 KSI (E60 ELECTRODE)
WELDING OTHER STEEL
BOLIO (O) I BINE HIME HOTH HOLO?
CENEDAL NOTES

GENERAL NOTES

ENGINEER SHALL BE NOTIFIED.

- 1. ALL CONSTRUCTION SHALL COMPLY FULLY WITH THE APPLICABLE PROVISIONS OF OSHA, THE CITY
- OF HUNTSVILLE, AND OTHER APPLICABLE STANDARDS.

 2. FIELD-VERIFY SITE CONDITIONS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. 3. IF BASE SLAB ELEVATION SHOWN OCCURS IN A DISTURBED, UNSTABLE, OR UNSUITABLE SOIL, THE
- 4. ALL STRUCTURAL OPENINGS AROUND OR AFFECTED BY MECHANICAL, ELECTRICAL, OR PLUMBING EQUIPMENT SHALL BE VERIFIED WITH EQUIPMENT PURCHASED BEFORE PROCEEDING WITH FABRICATION
- 5. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR OPENINGS, SLEEVES,
- ETC. NOT SHOWN ON THE STRUCTURAL DRAWINGS. PROVIDE FRAMING OR REINFORCING.
- THERE WILL BE NO BACKFILLING OPERATIONS UNTIL THE CONCRETE WALLS HAVE REACHED THEIR 28
- DAY DESIGN STRENGTH, UNLESS NOES OTHERWISE OR APPROVED BY THE ENGINEER.

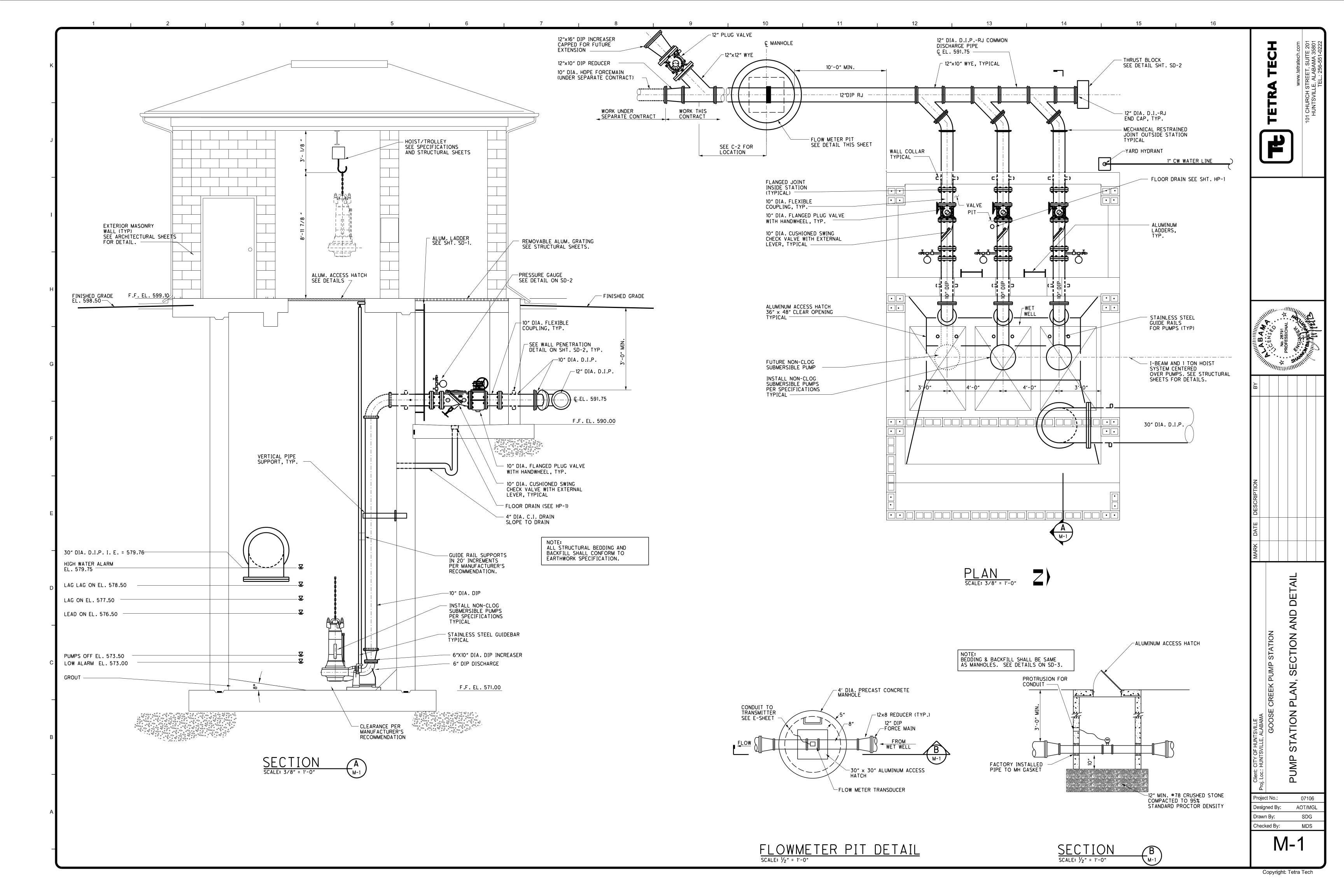
 ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" U.N.O.

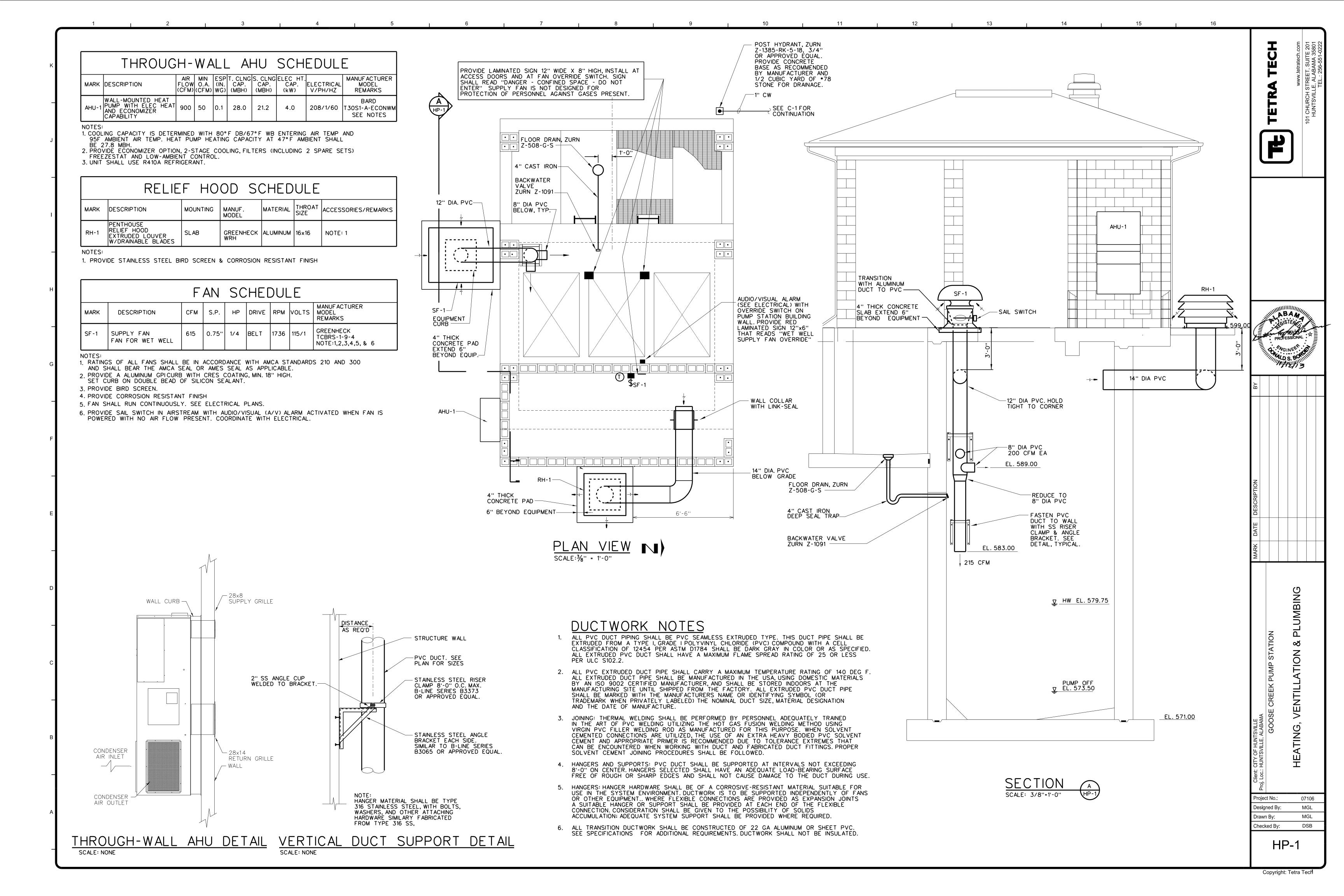
 THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY BRACING AND OTHER MEASURES NECESSARY TO
- PROTECT THE STRUCTURE AND ANY PERSONNEL DURING CONSTRUCTION.

 9. ANY COLD JOINTS FORMED BY CONTRACTOR IN THE STRUCTURE SHALL HAVE WATERSTOP INSTALLED
- IN THEM UNLESS NOTED OTHERWISE.

- 1. ALL CONCRETE CONSTRUCTION SHALL COMPLY WITH ACI 301, "SPECIFICATIONS FOR STRUCTURAL
- 2. CONCRETE DESIGN COMPLIES WITH ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL
- 3. CONCRETE DESIGN COMPLIES WITH ACI 350, "CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING
- CONCRETE STRUCTURES." 4. MASONRY DESIGN COMPLIES WITH ACI 530, "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES"
 AND ACI 530.1, "SPECIFICATIONS FOR MASONRY STRUCTURES".
 5. STRUCTURAL STEEL DESIGN IS PER THE CURRENT EDITION OF A.I.S.C.

8 TRUCTURAL DETAILS AND ST ARD I Project No 07106 Designed By: AJF Drawn By: AJF Checked By: CC



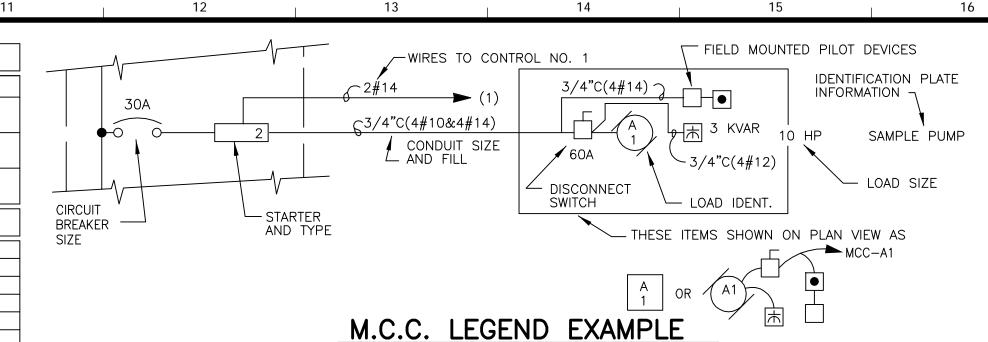


1	2 3 4		5	6	7	8	9		10 11	
BACKGRO	OUND PLAN AND ONE LINE SYMBOLS	GRAPHIC	SYMBOL	FOR INSTRUMEN	TATION ITEMS		WIRING DEVICE	SCHE	DULE]
SYMBOL	DESCRIPTION		DEVICE MOUNTEI			SYMBOL	DESCRIPTION		NEMA TYPE]
•	CONTROL SWITCH (SEL. OR P.B.) SEE CIRCUITS FOR SPECIFIC TYPE					<u></u>	125V, 2P, DUPLEX, 3W	5-20	R	_
F FL	SEE CIRCUITS FOR SPECIFIC TYPE FLOAT SWITCH — FLOW SWITCH		DEVICE MOUNTE	EL MOUNTED DEVICE— D INSIDE PANEL		<u> </u>	20A, 120/277 V SWITCH	SPST		
T M	TEMPERATURE — HUMIDISTAT SWITCH (SUBSCRIPT = NO. OF STAGES)		FIELD OR LOCA	LLY MOUNTED DEVICE		\$3	20A, 120/277 V THREE WAY SW			
L P V	LIMIT (PROXIMITY TYPE) PRESSURE - VACUUM SWITCH		PROGRAMMED FU ACCESSIBLE TO	JNCTION NOT NORMALLY		SYMBOL	I.S.A. STANDARD L	ETTER I	FUNCTIONS SUCEEDING LETTERS]
ALT	ELECTRICAL OR MECHANICAL ALTERNATOR (SEE WIRING)					- A ,	ANALYSIS , ANALOG BURNER , FLAME	ALARM BATCH		-
os —	OVERLOAD SWITCH OR DEVICE		OPERATOR'S INTI	JNCTION ACCESSIBLE THROUGH ERFACE DEVICE		C	CONDUCTIVITY , COMMAND DENSITY , SPECIFIC GRAVITY	l l	ROL (FEEDBACK TYPE)	-
TB	TERMINAL BOX		PLC INPUT OR OU	UTPUT POINT		E '	VOLTAGE FLOW RATE	PRIMAI RATIO	RY ELEMENT	1
\otimes	SOLENOID VALVE	\Diamond	INTERLOCKING			G	GAGING HAND , MANUAL	GLASS HIGH		<u> </u>
PC	PHOTOCELL LINE VOLTAGE AS NOTED (LIGHTING PANEL, CONTROL PANEL,	\$	MOTOR STARTER	?		1	CURRENT	INDICA SCAN	TE	- F
	AS NOTED (LIGHTING PANEL, CONTROL PANEL, DISTRIBUTION PANEL ETC.) WALL MOUNTED JUNCTION BOX	(L)	COMPLEX LOGIC			K	TIME , TIME SCHEDULE LEVEL , LIGHT		ROL (NO FEEDBACK)	- 2 - C
JB	TRANSFORMER		FLOAT SWITCH				MOISTURE , HUMIDITY		E , MODULATE	',
38	TRAINSFORMER		OFF PAGE CONN	NECTOR			OVERLOAD PRESSURE , VACUUM	ORIFIC POINT		3
	CONDUIT WITH CONDUIT SEAL FITTING		PROCESS MACHI	INERY MOTOR		Q	QUANTITY RADIOACTIVITY		IZE , INTEGRATE RD , PRINT , RECEIVE	-
	CONDUIT EXPOSED CONDUIT CONCEALED	\times	IN-LINE FLOW E	ELEMENT (PROPELLER TYPE)			SPEED , FREQUENCY , SOLENOID FEMPERATURE , TURBIDITY	SWITCH TRANS	H SMIT , TRANSFORM	-
_			IN-LINE FLOW E	ELEMENT (MAGNETIC TYPE)			MULTIVARIABLE VIBRATION , VISCOSITY	l l	FUNCTION , DAMPER , LOUVER	-
——E—	DIRECT BURIED CONDUIT DIRECT BURIED CABLE		IN-LINE FLOW E	ELEMENT (ULTRA SONIC)		W X	WEIGHT , FORCE			4
—— UG ——			PUMP			Y	POSITION	l l	, COMPUTE , ACTUATE] [
—— OH —— —— DB ——	OVERHEAD LINE UNDERGROUND DUCT BANK						INSTRUMENTATION	LINE	SYMBOLS	j c
1	CONCRETE ENCASED DUCT BANK, WITH CABLE LOCATIONS AND SPARE DUCTS AS		BLOWER			SYMBOL	- ELECTRICAL SIGNAL	DESCRIPTION		6
(1) (1) (2) (3) (4) (5)	CABLE LOCATIONS AND SPARE DUCTS AS INDICATED ON DRAWINGS	0	GENERAL USE D	ISCONNECTING SWITCH		-//	· I HYDRAULIC SIGNAL			1 S - P
	CABLE REEL		LIGHTNING ARRE	STOR		-0-		IGNAL		7
—— EDB——	EXISTING UNDERGROUND DUCT BANK	(ETI)	ELAPSED TIME II	NDICATOR		E-NET	CONNECTION TO PROCESS, OR ETHERNET COMMUNICATION SIG	NAL-UNSHIELDE		'' [8
	MULT-STACK ALARM LIGHTS	T	TIMING RELAY CO	OIL		E-FO	PAIR (UTP)—SPEED AS INDICATI ETHERNET FIBER OPTIC COMMU		NAL] P
	SELECTOR SWITCH/PUSHBUTTON. FUNCTIONS AS SHOWN IN WIRING DIAGRAMS	(T)	TIMED RELAY CC	DIL (OFF-DELAY)		FO E-VFO	PLC REMOTE I/O FIBER OPTIC ETHERNET VIDEO FIBER OPTIC	COMMUNICATION	N SIGNAL] 9] S
0	LOW VOLTAGE DISCONNECT SWITCH	1-1		,		CC	ONTROL CIRCUIT & I	PILOT DE	EVICE LEGEND] 1
	LOW VOLTAGE FUSE (BELOW 600V)	G	INDICATING LIGHT	T		SYMB		, , , ,] 1 E
RV 2	ALL STARTERS SHALL BE FULL VOLTAGE NON-REVERSING UNLESS OTHERWISE INDICATED DEVERSING	140	PUSH-TO-TEST	INDICATING LIGHT			PRESS. ACTUATED SWITCH	# o c	SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN	1
FVR 3 2S,2W	OTHERWISE INDICATED (FVR) FULL VOLTAGE REVERSING (RV) REDUCED VOLTAGE (2S,2W) TWO SPEED, TWO WINDING	° <u>X1</u>	SECONDARY TRA	NSFORMER				<u> </u>	MOMENTARY PUSHBUTTON	I[P
0 0	600V, 3 POLE MOLDED CASE CIRCUIT BREAKER, FRAME & RATING AS SHOWN	0	MOLDED CASE (CIRCUIT BREAKER				0 0	OPERATOR—NORMALLY OPEN MOMENTARY PUSHBUTTON	1
(1/2) A-3	SINGLE PHASE, FRACTIONAL HP MOTOR TO LOCATION INDICATED (SEE NOTE 2)	٥ ١ ٥	MOMENTARY PUS	SHBUTTON OPERATOR— NORMAL	LY CLOSED			0 L 0 0 T 0	OPERATOR-NORMALLY CLOSED PUSHBUTTON OPERATOR	1 1
A ₁	THREE PHASE LOAD WITH IDENTIFICATION	0 0	MOMENTARY PUS	SHBUTTON OPERATOR— NORMAL	LY OPEN	~	NORMALLY OPEN LIMIT SWITCH—	0 0 (F)	WITH MUSHROOM HEAD FIELD LOCATED STOP BUTTON	1 "
	HIGH VOLTAGE FUSE (ABOVE 600 V)	0 0	SELECTOR SWITC	CH-NORMALLY OPEN		0 0 0	NORMALLY CLOSED LIMIT SWITCH—NORMALLY		TIELD EGGATED STOT BOTTON	-
□——(FI	TAG NO. (BALLOON) FOR DEVICE INDICATED	οΤο	PUSHBUTTON OF	PERATOR WITH MUSHROOM HEAI	D		CLOSED-HELD OPEN LIMIT SWITCH-NORMALLY	-0 0-	MAINTAINED PUSH-PULL OPERATOR	
A-3	FOR POWER (SEE NOTE 2) 3/4"C(2/C#18 SHLD.)CONDUIT AND WIRE RUN FROM DEVICE INDICATED TO LOCATION INDICATED	<u> </u>	SOLENOID OR C	LUTCH		0,0	OPEN-HELD CLOSED	`		-
MCP OR CP-1		~X~o	THERMAL OVERLO	OAD			TIME-DELAY FUSE	0 0	MAINTAINED STOP-START PUSHBUTTON OPERATOR	
	CAPACITOR, 3 PHASE, SIZE AS INDICATED DISCONNECT SWITCH	(F)	FIELD LOCATED			CR)	- CONTROL RELAY COIL	<u> </u>	COLENOID OF CLUTOLI	-
	DISCONNECT SWITCH (F) = FUSED (C) = CIRCUIT BREAKER MAGNETIC STARTER	-	TERMINAL POINT				CONTROL RELAY	· · · ·	SOLENOID OR CLUTCH	-
Г	MAGNETIC STARTER (BACKGROUND DRAWINGS ONLY) COMBINATION MAGNETIC STARTER FUSED UNLESS NOTED (CIRCUIT BREAKER)		LOW VOLTAGE F				CONTACT-NORMALLY OPEN CONTROL RELAY	0 R 1 €0	PUSH-TO-TEST INDICATING LIGHT	
SIZE 2	COMBINATION LIGHTING CONTACTOR WITH HAND-OFF-AUTO SWITCH		FUSIBLE TERMIN	IAL BLOCK		-CR	CONTACT-NORMALLY CLOSED	<u> </u>	MAINTAINED STOP-	-
	WITH HAND-OFF-AUTO SWITCH MANUAL STARTER (R) = REVERSING	∞ (000)	CIRCUIT BREAKEI	R WITH STAB CONNECTION		-CR	TWO COIL LATCHING RELAY	0 0 0	MOMENTARY START PUSHBUTTON (JOG)	
CP CP	(R) = REVERSING CONTROL PANEL		CONTROL POWER	R TRANSFORMER			TIMING RELAY COIL	0,0		
1/8 UH-19	UNIT HEATER, 1/8 HORSEPOWER	CR L	TWO 0011 1 1 TO	W10 551 W					ZERO SPEED OR ANTI- PLUGGING SWITCH	
0H−19	LIGHTNING ARRESTOR	CR U	TWO COIL LATCH	HING RELAY			TIMED OPEN CONTACT	0	LOCAL TERMINALS WITH	-
A-3	LOW VOLTAGE HOME RUNS 120/208 V 120/240 V (SEE NOTE 2)		RECEPTACLE				ON ENERGIZATION TIMED OPEN CONTACT ON DE-ENERGIZATION	ETI)	EXTERNAL WIRING ELAPSED TIME INDICATOR	-
NEMA 4	WATERTIGHT	+00+	SELECTOR SWITC	CH OPERATOR WITH FUNCTION S	SHOWN			INST.		-
NEMA 4X	WATERTIGHT AND CORROSION PROOF					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	X2 120 VAC TRANSFORMER	INST.	TIMING RELAY INSTANTANEOUS CONTACTS	
NEMA 7	EXPLOSION PROOF — CLASS I, DIVISION I, GROUP D	SYMBOL	DESCRIPTION	SYMBOLS FOR V	ALVES]	-	`\inst.		1
NEMA 9	EXPLOSION PROOF — CLASS II, DIVISION 1		STROKE OR POSI CYLINDER (OPEN-	TION ACTUATOR -SHUT)		1				
⟨ĸ⟩	KEYLOCK		STROKE OR POSITION CYLINDER (THROT	TION ACTUATOR		1				
SD	SMOKE DETECTOR		,	RAGM OR POSITIONER (OPEN—S	SHUT)	1				
E	EXIT LIGHT	A	PNEUMATIC DIAPH	IRAGM OR POSITIONER (THROTTI	LING)					
	FLUORESCENT LUMINAIRE	\bowtie	BALL VALVE	·						
	INCANDESCENT LUMINAIRE		GLOBE VALVE							
	HIGH INTENSITY DISCHARGE LIGHT	\boxtimes	GATE VALVE OR K	KNIFE GATE						
EM	EMERGENCY BATTERY PACK	2	CHECK VALVE							
DS	DESK INTERCOM SET	M	PLUG VALVE	LC I/O ADDRESS SHALL BE USED	AS THF					

NOTE: THE PLC I/O ADDRESS SHALL BE USED AS THE WIRING TAG SCHÉME FOR ALL PANEL AND FIELD CONTROL

WIRING. COORDINATE WITH ELECTRICAL CONTRACTOR.

CAMERA



1. FOR ITEMS INDICATED AS "FIELD LOCATE", CHECK THE DRAWINGS OF OTHER TRADES FOR INTERFERENCE AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTIONS POINTS, ETC.

2. INSTALL A SINGLE CONDUCTOR INSULATED (RHW, THHN, OR XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS, OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. THIS ALSO INCLUDES INSTRUMENTATION DEVICES SUCH AS LEVEL, PRESSURE, FLOW TRANSMITTERS, LIMIT SWITCHES, CONDUITS, NETWORK AND I/O CABLES.

- 3. THE FOLLOWING EXAMPLE COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE:
- (F) FIELD MOUNTED, NOT AT STARTER OR OTHER CONTROL PANELS
- (S) STARTER PANEL MOUNTED
- (MCP) AT MAIN CONTROL PANEL (1) AT CONTROL PANEL NO.1
- (2) AT CONTROL PANEL NO.2 (TCP) AT TEMPERATURE CONTROL PANEL
- 4. NO WIRES SHALL BE TERMINATED TO TERMINAL STRIPS. OR OTHER EQUIPMENT WITHOUT FIRST VERIFYING SIGNAL TYPE. DAMAGES RESULTING FROM LACK OF VERIFICATION SHALL BE BORNE BY CONTRACTOR. CONTRACTOR SHALL COORDINATE SIGNAL TYPE WITH I/O CARDS.

5. CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS, AND SITE PLANS ARE INTENDED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS FOR ALL CONDUITS, AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER. CONDUIT TO BE CONCEALED IN THESE AREAS.

6. ETHERNET AND FIBER OPTIC TERMINATIONS SHALL BE PERFORMED BY A QUALIFIED REPRESENTATIVE OF CABLE MANUFACTURER, THE CABLES SHALL BE TESTED. NO SPLICING SHALL BE PERMITTED OF FIBER OPTIC CABLES, BETWEEN PANELS. ALL FIBERS SHALL BE TERMINATED AT PATCH PANELS, INCLUDING SPARES.

7. REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES. INSTALL NEW PULL BOXES (PB) AS REQ'D FOR CONDUITS. SIZE PULL BOXES AS REQ'D PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.

8. RACEWAYS, PULLBOXES AND JUNCTION BOXES TO BE INSTALLED WITH CHANNEL STRUT. MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE.

9. WIRING FOR STARTERS SHALL BE IN ACCORDANCE WITH NEMA CLASS II B STANDARDS. SUBMIT ENGINEERED SHOP DRAWINGS FOR ALL STARTERS SHOWN TO BE WIRED.

10. CONTROL PANELS SHALL BE MOUNTED OFF WALLS WITH STRUT. CONDUITS SHALL BE MOUNTED ON STRUT INCLUDING SINGLE RUNS.

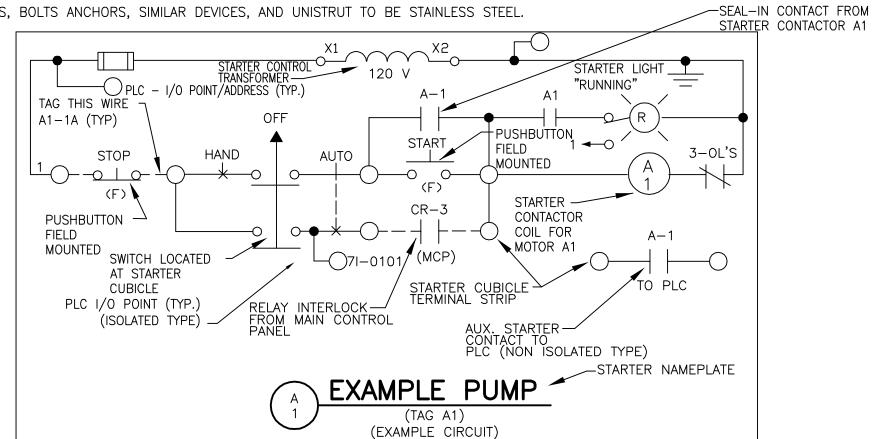
11. CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANEL.

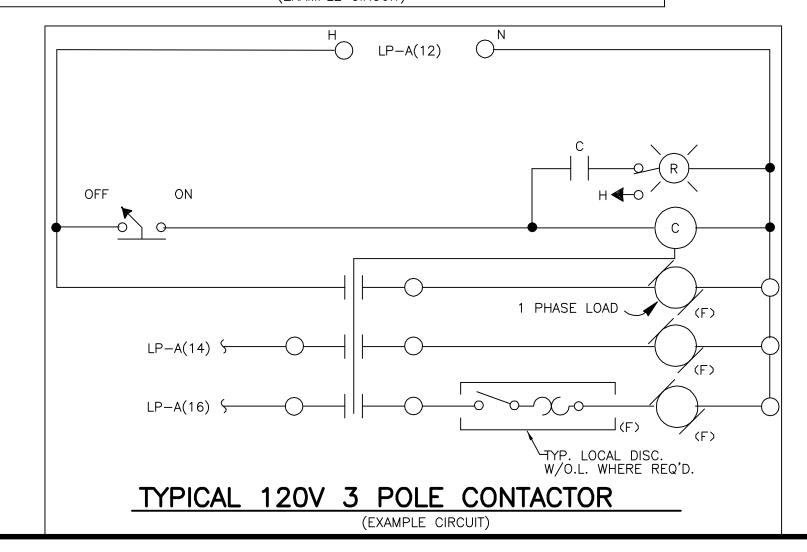
12. CABLES (INCLUDING FIBER, ETHERNET, CONTROL WIRE, ETC.) WHERE PASSING THROUGH A PULLBOX SHALL BE LABELED AND COMPLETELY IDENTIFIED WITH IDENTIFICATION NUMBERS AND ORIGINATION/DESTINATION. THIS ALSO INCLUDES ALL CABLE BUNDLES ENTERING CONTROL PANELS, PULLBOXES, ETC.

13. CONTROL WIRES SHALL BE TAGGED WITH THE PLC I/O ADDRESS IN THE FIELD, AND IN THE STARTER.

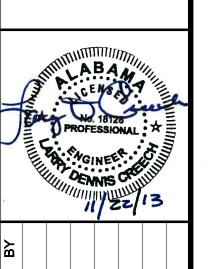
14. FIELD CONTROL WIRING BETWEEN MOTOR CONTROL CENTERS, FIELD STARTERS, FIELD CONTACTORS, AND CONTROL PANELS SHALL BE YELLOW #14AWG.

15. ALL NUTS, BOLTS ANCHORS, SIMILAR DEVICES, AND UNISTRUT TO BE STAINLESS STEEL.









ELECTRICAL LEGEND & NOTES

Project No.:

Designed By: Drawn By: JLS Checked By:

	GRAPHIC SYMBOL FOR INST	TRUMENT	ATION ITEMS
	DEVICE MOUNTED ON PANEL		LIMIT SWITCH (PROXIMITY TYPE)- NORMALLY OPEN
	BOARD OR PANEL MOUNTED DEVICE— DEVICE MOUNTED INSIDE PANEL	000	LIMIT SWITCH (PROXIMITY TYPE)- NORMALLY OPEN - HELD CLOSED
	FIELD OR LOCALLY MOUNTED DEVICE	000	LIMIT SWITCH (PROXIMITY TYPE)- NORMALLY CLOSED - HELD OPEN
	PROGRAMMED FUNCTION NOT NORMALLY ACCESSIBLE TO OPERATOR	000 000	LIMIT SWITCH (PROXIMITY TYPE)— NORMALLY CLOSED
	PROGRAMMED FUNCTION ACCESSIBLE THROUGH OPERATOR'S INTERFACE DEVICE		CONTROL RELAY CONTACT—NORMALLY OPEN
	PLC INPUT OR OUTPUT POINT (ADDRESS AS SHOWN)	N	CONTROL RELAY CONTACT—NORMALLY CLOSED
\Diamond	INTERLOCKING		LIGHTNING ARRESTOR
\(\sqrt{\text{QIR}}\)	EXCLUSIVE OR	ETI)	ELAPSED TIME INDICATOR
(A)	ALTERNATOR	(T)	TIMING RELAY COIL
	OR	(T)	TIMED RELAY COIL (OFF-DELAY)
AND	AND	G	INDICATING LIGHT
(\$)	MOTOR STARTER		PUSH-TO-TEST INDICATING LIGHT
(P)	PURGE	140	BATTERY
		×1 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2	SECONDARY TRANSFORMER
L)	COMPLEX LOGIC COMPUTER LOGIC SYSTEM		
	TERMINAL OR TRANSITION POINT		VARIABLE RESISTOR
			MOLDED CASE CIRCUIT BREAKER
	FLOAT SWITCH PARSHALL FLUME	6 0	SPEED SWITCH
8—	MIXER	0_10	MOMENTARY PUSHBUTTON OPERATOR— NORMALLY CLOSED
· ~			
	SEAL	0 0	MOMENTARY PUSHBUTTON OPERATOR - NORMALLY OPEN
	OFF PAGE CONNECTOR	0 1 0	SELECTOR SWITCH-NORMALLY OPEN
	PROCESS MACHINERY MOTOR	o To	PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
	VENTURI OR INSERT FLOW TUBE		SOLENOID OR CLUTCH
\times	IN-LINE FLOW ELEMENT (PROPELLER TYPE)	0-X-0	THERMAL OVERLOAD
	IN-LINE FLOW ELEMENT (MAGNETIC TYPE)	(F)	FIELD LOCATED
	IN-LINE FLOW ELEMENT (ULTRA SONIC)	0—0	TERMINAL POINT
	FLOW ORIFICE		LOW VOLTAGE FUSE
中	TURBIDIMETER		FUSIBLE TERMINAL BLOCK
	ROTAMETER	∞-6000	CIRCUIT BREAKER WITH STAB CONNECTION
	PUMP	<u>~~</u>	CONTROL POWER TRANSFORMER
•	BLOWER	(CR L	TWO COIL LATCHING RELAY
0	GENERAL USE DISCONNECTING SWITCH	(CR U	
200	TIMED CLOSED CONTACT ON ENERGIZATION	Ŷ	RECEPTACLE
T	TIMED OPEN CONTACT ON ENERGIZATION	1 - 2 -	SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
→	TIMED OPEN CONTACT ON DE-ENERGIZATION		1111 TONOHON SHOWN
70	TIMED CLOSED CONTACT ON DE-ENERGIZATION	FOC-DI(X)	DISCRETE INPUT TO FIBER CONVERTER (PROVIDE WITH 120VAC P/S FIBER CONVERTER TO DISCRETE OUTPUT (PROVIDE WITH 120VAC P/S
2	FLOAT ACTUATED SWITCH-NO	FOC-DO(X)	(WEED EOTEC - 2S07/2H07 WITH 120VAC P/S) QUANTITY (X) AS NOTED ON DRAWINGS
oTo	FLOAT ACTUATED SWITCH—NC	FOC-AI(X)	ANALOG INPUT TO FIBER CONVERTER FIBER CONVERTER TO ANALOG OUTPUT
To	PRESSURE ACTUATED SWITCH-NC	FOC-AO(X)	(WEED EOTEC 2T14/2R14 WITH 120VAC P/S) QUANTITY (X) AS NOTED ON DRAWINGS
0	PRESSURE ACTUATED SWITCH-NO	FOC	FIBER OPTIC CONVERTER — TYPE AND STYLE AS NOTED
7	FLOW ACTUATED SWITCH-NO	FOPP	FIBER OPTIC PATCH PANEL CONNECTORS AND QUANTITY AS NOTED
00	FLOW ACTUATED SWITCH-NC		
- A	TEMPERATURE SWITCH-NO		11 PROCESSOR #1 INDUIT DACK O
<u></u>	TEMPERATURE SWITCH-NC	1	PROCESSOR #1, INPUT RACK 0, SLOT (OR GROUP) 1, BIT 17

<u></u>	
(0117)	

EXAMPLE OF P&ID I/O SYMBOL

NOTE: THE PLC I/O ADDRESS SHALL BE USED AS THE WIRING TAG SCHEME FOR ALL PANEL AND FIELD CONTROL WIRING. COORDINATE WITH ELECTRICAL CONTRACTOR.

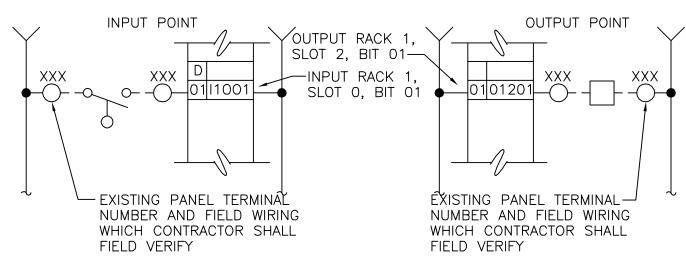
GRAF	PHIC SYMBOLS FOR VALVES
SYMBOL	DESCRIPTION
	STROKE OR POSITION ACTUATOR CYLINDER (OPEN—SHUT)
	STROKE OR POSITION ACTUATOR CYLINDER (THROTTLING)
	PNEUMATIC DIAPHRAGM OR POSITIONER (OPEN-SHUT)
	PNEUMATIC DIAPHRAGM OR POSITIONER (THROTTLING)
	MOTOR OPERATED (THROTTLING)
\bigotimes	MOTOR OPERATED (OPEN-SHUT)
	SLIDE-STOP GATE
	SLUICE GATE
$\overline{\forall}$	AIR SET ASSEMBLY
D801	BALL VALVE
	GLOBE VALVE
\bowtie	GATE VALVE OR KNIFE GATE
	CHECK VALVE
M	PLUG VALVE
1×1	BUTTERFLY VALVE, DAMPER OR LOUVER
	TWO-WAY SOLENOID VALVE OPERATOR
	ELECTRONICALLY CONTROLLED CHECK VALVE
	TWO-WAY SOLENOID VALVE OPERATOR-DETENTED
	THREE-WAY SOLENOID VALVE OPERATOR
	FOUR-WAY SOLENOID VALVE OPERATOR
	MANIFOLD STYLE BLOCK I/O

SOLENOID VALVE - DUAL COILS

SYMBOL	DESCRIPTION
R	RESET
T	TRIP
AS	AIR SUPPLY
DO	DISSOLVED OXYGEN
GS	GAS SUPPLY
HS	HYDRAULIC SUPPLY
NS	NITROGEN SUPPLY
ORP	OXYGEN REDUCTION POTENTIAL
SS	STEAM SUPPLY
SP	SET POINT
WS	WATER SUPPLY
PV	PROCESS VARIABLE
F.O.	FAIL OPEN
F.C.	FAIL CLOSE
SBPP	SCREEN BUILDING PROCESSOR PANEL
TFBMPP	TERTIARY FILTER BUILDING MAIN PROCESSOR PANEL
HVACP	HEATING VENTILATION AIR CONDITIONING CONTROL PANEL-I/O
MD	MAIN DISCONNECT
%	GAIN OR PROPORTIONAL CONTROL
ſ	INTEGRAL OR RESET CONTROL
D	DERIVATIVE OR RATE CONTROL
V	VELOCITY ALGORITHM
1-0	ON-OFF CONTROL
√_	SQUARE ROOT EXTRACTOR
€	ADD OR TOTALIZE
Δ	SUBTRACT OR DIFFERENCE
>	HIGHEST MEASURED VARIABLE
<	LOWEST MEASURED VARIABLE
/I , I/P	CONVERT ONE TO ANOTHER
Χ,÷	MULTIPLY , DIVIDE
€	BIAS OR REVERSING
f(x)	CHARACTERIZE - (EQUATION / /D/%/ETC.)

		10.			
INSTR	JMENTATION LINE SYMBOLS				
SYMBOL	DESCRIPTION				
	ELECTRICAL SIGNAL				
	AIR LINE/PNEUMATIC SIGNAL				
	HYDRAULIC SIGNAL				
	ELECTROMAGNETIC OR SONIC SIGNAL				
o	SOFTWARE SIGNAL				
	CONNECTION TO PROCESS, OR MECHANICAL LINK	11.			
E-NET	ETHERNET COMMUNICATION SIGNAL—UNSHIELDED TWISTED PAIR (UTP)—SPEED AS INDICATED				
E-FO	ETHERNET FIBER OPTIC COMMUNICATIONS SIGNAL				
FO	PLC REMOTE I/O, CONTROL NET FIBER OPTIC COMMUNICATION SIGNAL				

I.S.A. STANDARD LETTER FUNCTIONS							
SYMBOL	FIRST LETTER	SUCEEDING LETTERS					
Α	ANALYSIS , ANALOG	ALARM					
В	BURNER , FLAME	BATCH					
С	CONDUCTIVITY , COMMAND	CONTROL (FEEDBACK TYPE)					
D	DENSITY , SPECIFIC GRAVITY						
Е	VOLTAGE	PRIMARY ELEMENT					
F	FLOW RATE	RATIO					
G	GAGING	GLASS					
Н	HAND , MANUAL	HIGH					
1	CURRENT	INDICATE					
J	POWER	SCAN					
K	TIME , TIME SCHEDULE	CONTROL (NO FEEDBACK)					
L	LEVEL , LIGHT	LOW					
М	MOISTURE , HUMIDITY	MIDDLE , MODULATE					
N							
0	OVERLOAD	ORIFICE					
Р	PRESSURE , VACUUM	POINT					
Q	QUANTITY	TOTALIZE , INTEGRATE					
R	RADIOACTIVITY	RECORD , PRINT , RECEIVE					
S	SPEED , FREQUENCY , SOLENOID	SWITCH					
Τ	TEMPERATURE , TURBIDITY	TRANSMIT , TRANSFORM					
U	MULTIVARIABLE	MULTIFUNCTION					
V	VIBRATION , VISCOSITY	VALVE , DAMPER , LOUVER					
W	WEIGHT , FORCE						
Χ							
Υ		RELAY , COMPUTE					
Z	POSITION	DRIVE , ACTUATE					



EXAMPLES OF I/O

GENERAL NOTES:

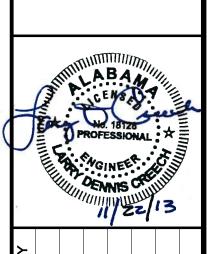
- PRIOR TO SUBMITTING A BID FOR THE WORK DETAILED UNDER THIS CONTRACT, BIDDER SHALL VISIT THE PROPOSED STATION SITE. THE BIDDER SHALL FULLY ACQUAINT ONESELF WITH FIELD CONDITIONS AT EACH SITE. NO BULLETINS WILL BE WRITTEN FOR WORK DUE TO LACK OF VERIFICATION OF EXISTING SITE CONDITIONS AND WIRING.
- 2. NO WIRES SHALL BE TERMINATED TO TERMINAL STRIPS, OR OTHER EQUIPMENT WITHOUT FIRST VERIFYING SIGNAL TYPE. DAMAGES RESULTING IN LACK OF VERIFICATION SHALL BE BORNE BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE SIGNAL TYPE AND VOLTAGE WITH I/O CARDS SHOWN.
- 3. WITHIN CONTROL PANELS, NAMEPLATES SHALL BE PROVIDED TO INDICATE DIFFERENT VOLTAGE LEVELS WITHIN PANELS. ALSO, A NAME TAG (YELLOW BACKGROUND, RED LETTERING) SHALL BE LOCATED ON THE FRONT OF EVERY PANEL INDICATING THAT WHEN MAIN PANEL DISCONNECTED 120V IS STILL PRESENT FROM FIELD DEVICES (YELLOW WIRING/ISOLATED INPUT CARDS.)
- 4. PHENOLIC TAGS ON FACE OF CONTROL PANELS TO HAVE WHITE BACKGROUND AND BLACK LETTERING (EXCEPT WARNING TAGS; YELLOW BACKGROUND RED
- 5. PROVIDE SAFETY COVERS ON ALL 480V MOLDED CASE MAIN CIRCUIT BREAKERS TO INSULATE THE INCOMING CABLES AND SIDE CONDUCTORS FROM CONTACT. (TYP. FOR ALL CONTROL PANELS.) PROVIDE BREAKER LOCKS FOR ALL PUMP CIRCUIT BREAKERS (MCP)AND MAIN PANEL BREAKERS.
- COMMON NEUTRAL MAY BE USED FOR SEVERAL ISOLATED INPUTS FROM THE SAME STARTER. PROVIDE NEUTRAL JUMPERS WIRES WITHIN THE PANEL AS REQUIRED.
- 7. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN THE LIGHTEST LINE WEIGHTS ARE FOR FUTURE WORK.
- 8. ITEMS SHOWN CROSSHATCHED (OR NOTED TO BE DEMOLISHED) ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED, FROM SITE BY CONTRACTOR.
- 9. INSTALL A SINGLE CONDUCTOR INSULATED (RHW, THHN, OR XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS, OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. THIS ALSO INCLUDES INSTRUMENTATION DEVICES SUCH AS LEVEL, PRESSURE, FLOW TRANSMITTERS, LIMIT SWITCHES, CONDUITS, NETWORK AND I/O CABLES.
- 10. THE FOLLOWING EXAMPLE COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE:
 - (F) FIELD MOUNTED, NOT AT STARTER OR OTHER CONTROL PANELS (S) STARTER PANEL MOUNTED (MCP) AT MAIN CONTROL PANEL
 - (1) AT CONTROL PANEL NO.1 (2) AT CONTROL PANEL NO.2 (TCP) AT TEMPERATURE CONTROL PANEL

SYSTEM COORDINATION AND INSTALLATION.

- REFER TO DETAIL SHEETS. CONTRACTOR SHALL FURNISH AND INSTALL HARDWARE AND APPURTENANCES (I.E. PIPE TAPS, WETWELL BUBBLER TUBES, VALVES, COPPER TUBING, BALL VALVES, PNEUMATIC PIPING, SPOOL PIECES, ETC.) FOR FIELD DEVICES SHOWN (FLOWMETERS, PRESSURE TRANSMITTERS, LEVEL TRANSMITTERS, ETC.). WORK SHALL BE COORDINATED WITH OTHER TRADES (MECHANICAL INSTRUMENTATION, ETC.) CONTRACTOR SHALL BE RESPONSIBLE FOR
- 12. ETHERNET AND FIBER OPTIC TERMINATIONS SHALL BE PERFORMED BY A QUALIFIED REPRESENTATIVE OF CABLE MANUFACTURER, THE CABLES SHALL BE TESTED. NO SPLICING SHALL BE PERMITTED OF FIBER OPTIC CABLES, BETWEEN PANELS. ALL FIBERS SHALL BE TERMINATED AT PATCH PANELS, INCLUDING SPARES.
- 13. REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES. INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULLBOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.

- 14. CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANEL.
- 15. CABLES (INCLUDING FIBER, ETHERNET, CONTROL WIRE, ETC.) WHERE PASSING THROUGH A PULLBOX SHALL BE LABELED AND COMPLETELY IDENTIFIED WITH IDENTIFICATION NUMBERS AND ORIGINATION/DESTINATION. THIS ALSO INCLUDES ALL CABLE BUNDLES ENTERING CONTROL PANELS, PULLBOXES, ETC.
- 16. CONTROL WIRES SHALL BE TAGGED WITH THE PLC I/O ADDRESS IN THE FIELD AND AT THE PANEL.
- 17. FIBEROPTIC CABLE (FO, E-FO) SHALL BE 62.5/125 MICRON, ALL DIELECTRIC, CORNING ALTOS SERIES, WITH WATERBLOK GEL AND SUITABLE FOR INSTALLATION IN AN UNDERGROUND, WET CONDUIT, PROVIDE STRANDS AS SHOWN. TERMINATE ALL STRANDS. FOR THE FIBEROPTIC CABLE SHOWN. FOR ANALOG AND DISCRETE I/O DEVICES, FIBER OPTIC CABLE SHALL BE (BELDEN M9B701) 2-STRAND BREAKOUT STYLE LOOSE BUFFER OUTDOOR RATED (900 MICRON BUFFER DIAMETER). AT FIELD ENCLOSURES, CONNECT DIRECTLY TO FOC-DI/DO/AI/AO MODULES. PATCH PANELS NOT REQUIRED AT FIELD DEVICES.
- 18. THE FIELD DEVICES SHOWN ON THE P&ID'S, ELECTRICAL BACKGROUNDS, AND DETAILS SHEETS MAKEUP THE FIELD DEVICE EQUIPMENT REQUIREMENTS. NOT ALL FIELD DEVICES REQUIRED ARE SHOWN ON THE P&ID'S.
- 19. UPS SELECTED TO BE COMPATIBLE WITH SOLA MCR TRANSFORMERS. (TYP.)
- 6. REFER TO WIRING DIAGRAMS FOR ADDITIONAL INFORMATION ON ISOLATED I/O. A 20. CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANELS, AND EQUIPMENT.
 - 21. REFER TO I/O DRAWING LAYOUT FOR ADDITIONAL SIGNALS NOT SHOWN ON P&ID

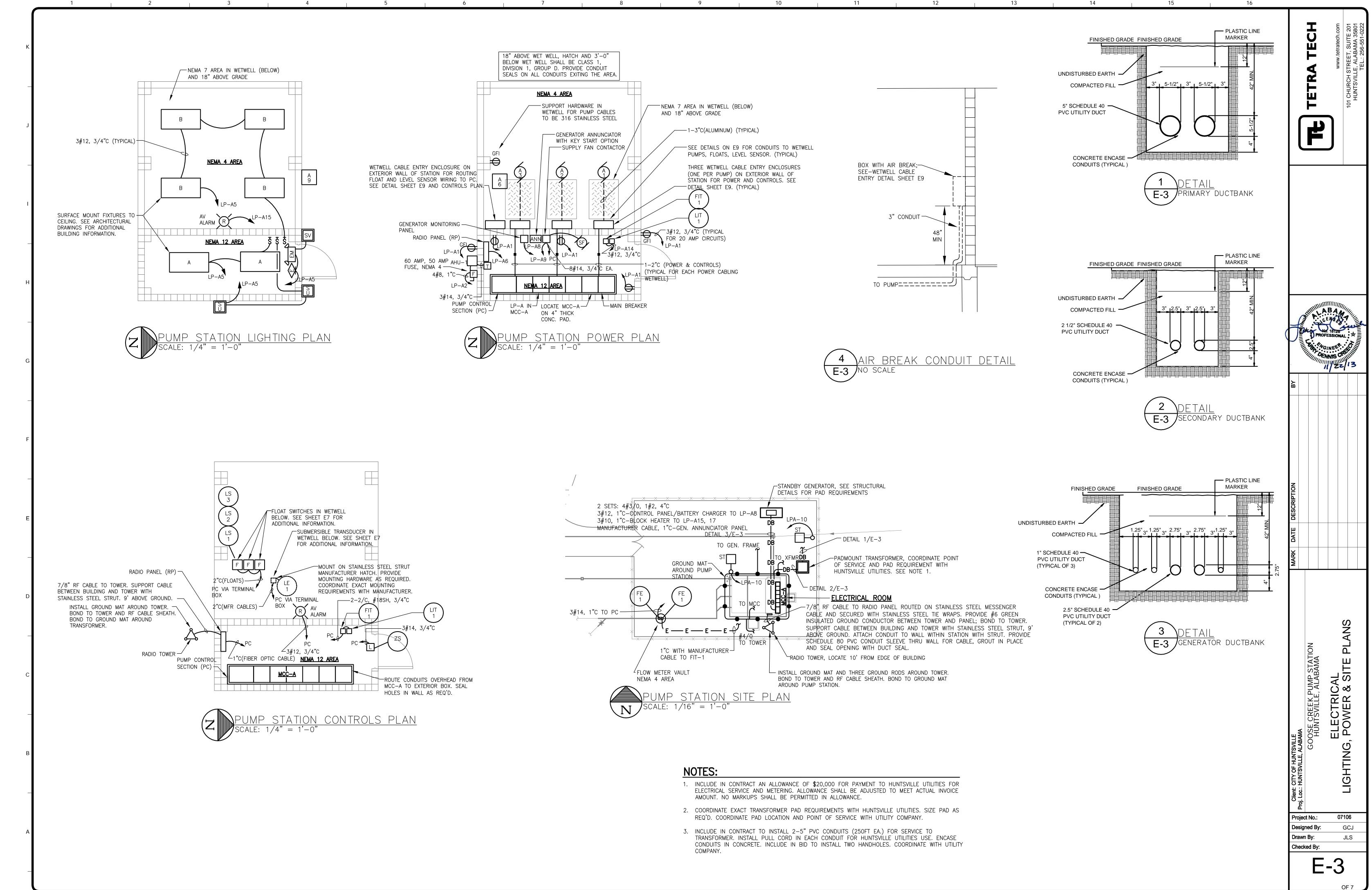


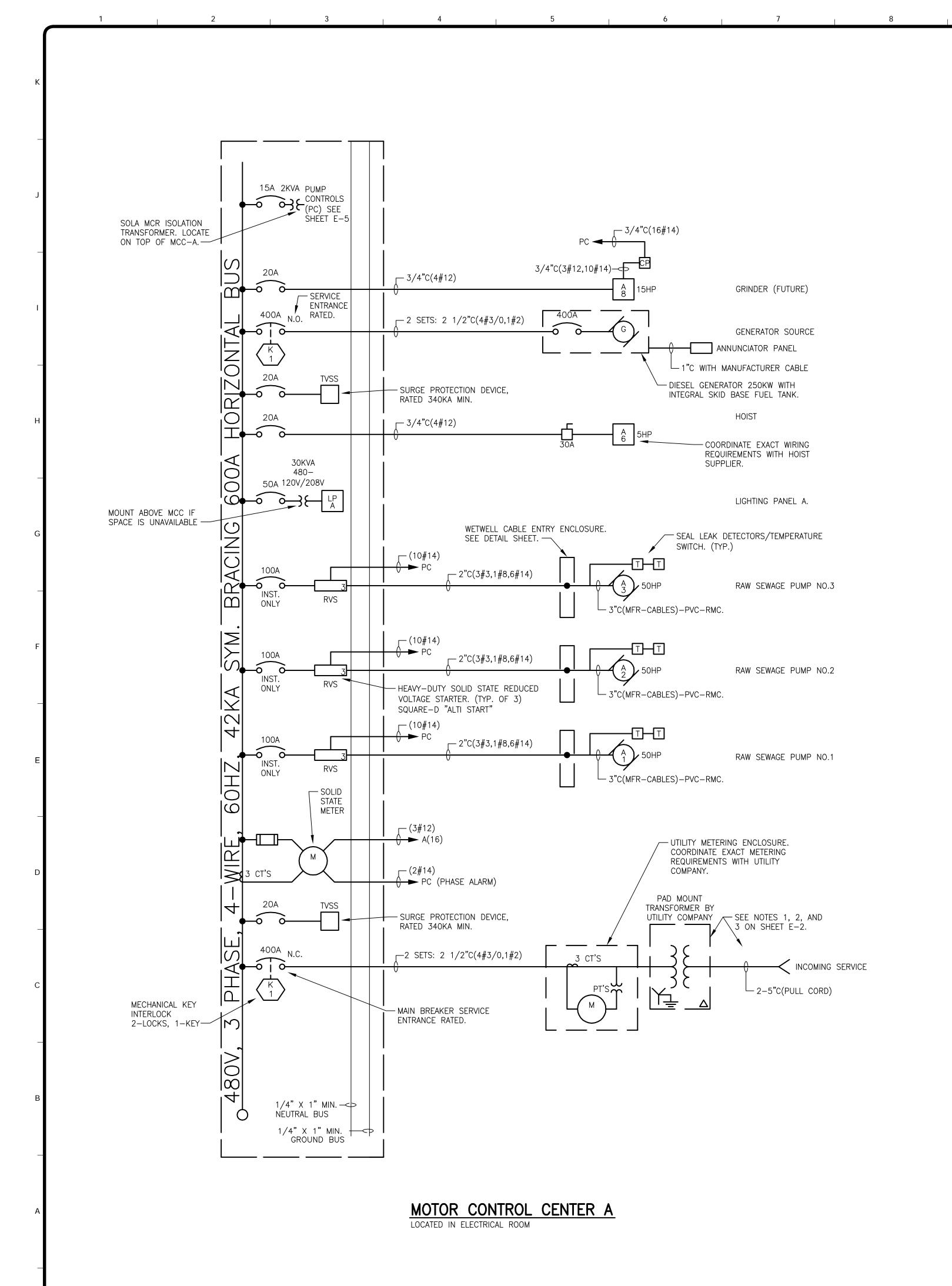


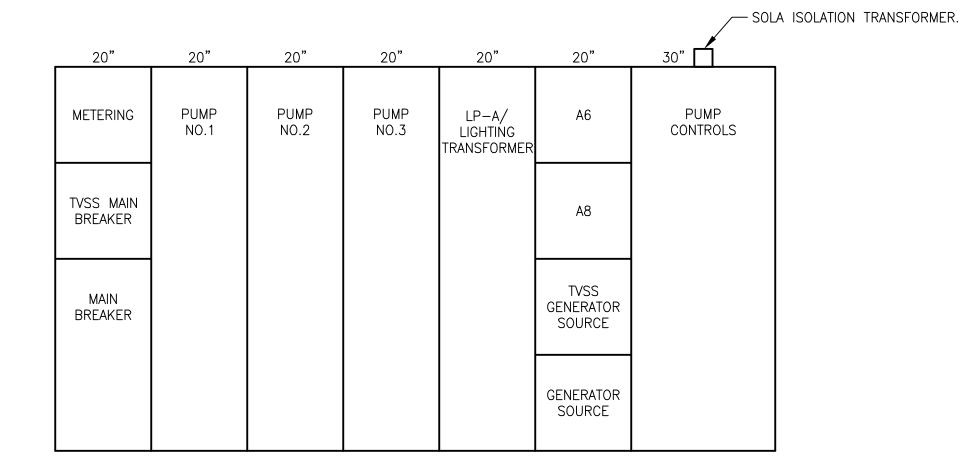
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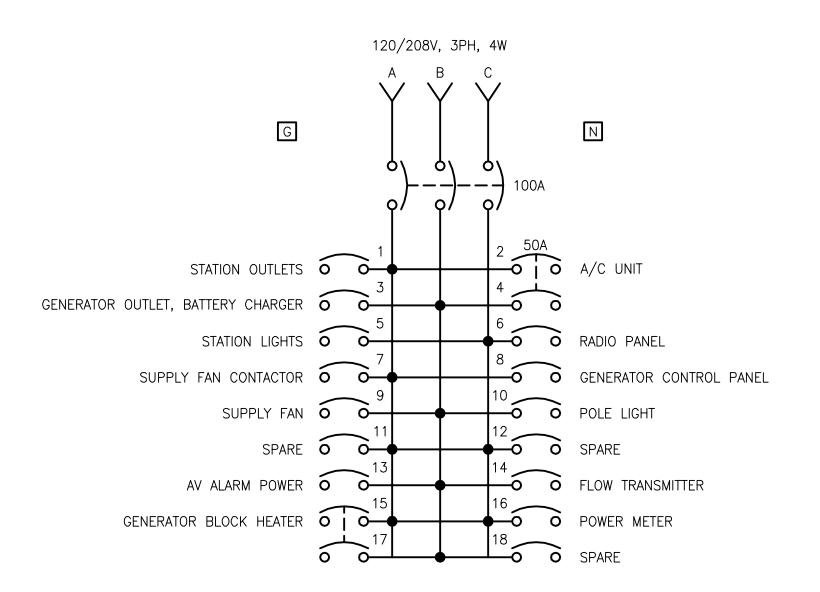




13

MOTOR CONTROL CENTER A LAYOUT

COORDINATE EXACT LAYOUT, AND SIZE WITH MANUFACTURER.



LIGHTING PANELBOARD SCHEDULE LP-A NOTE: ALL BREAKERS RATED 20A UNLESS NOTED OTHERWISE

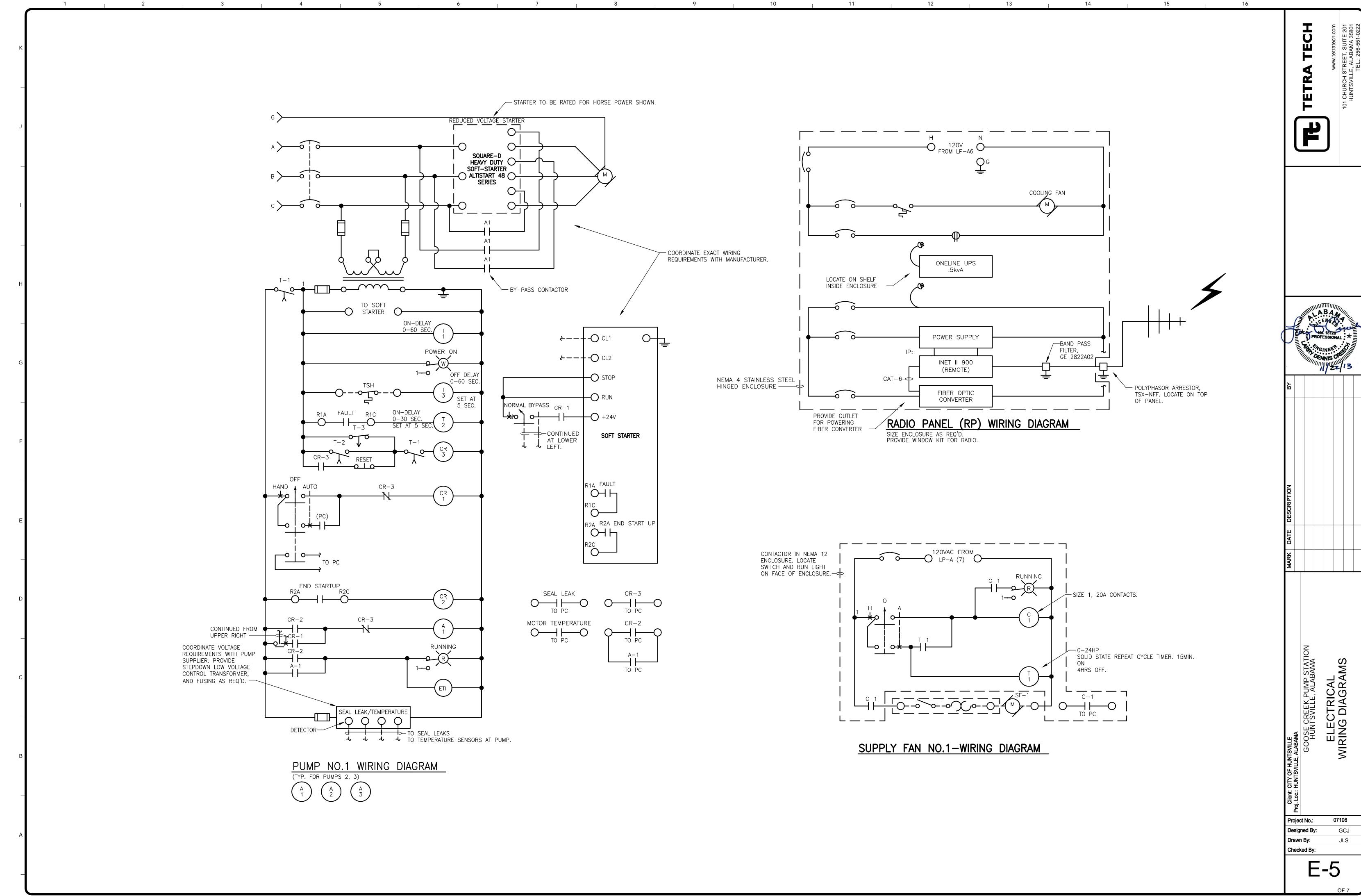
L-LOCKABLE G-GROUND FAULT INTERRUPTER

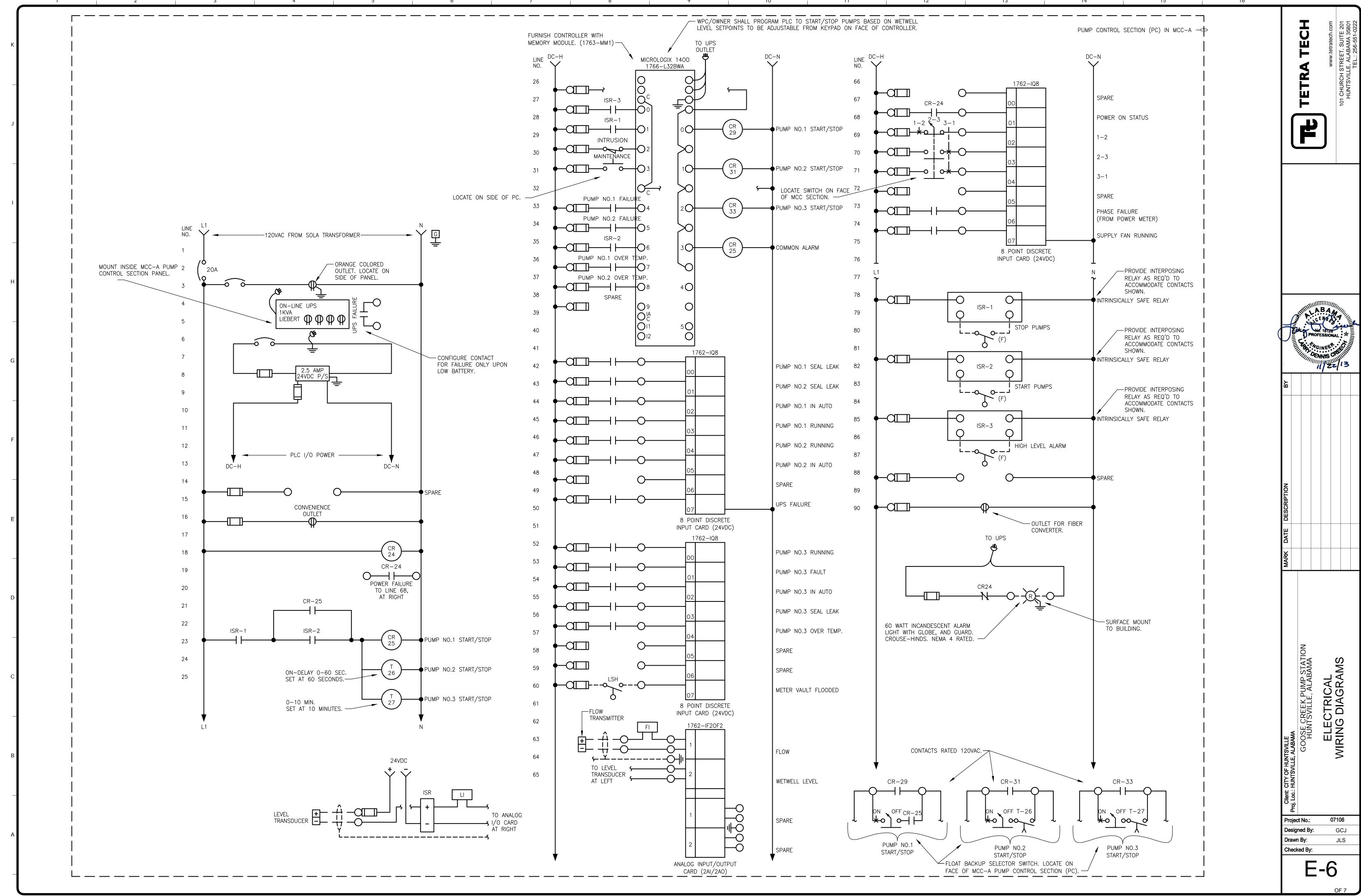
14 15 16

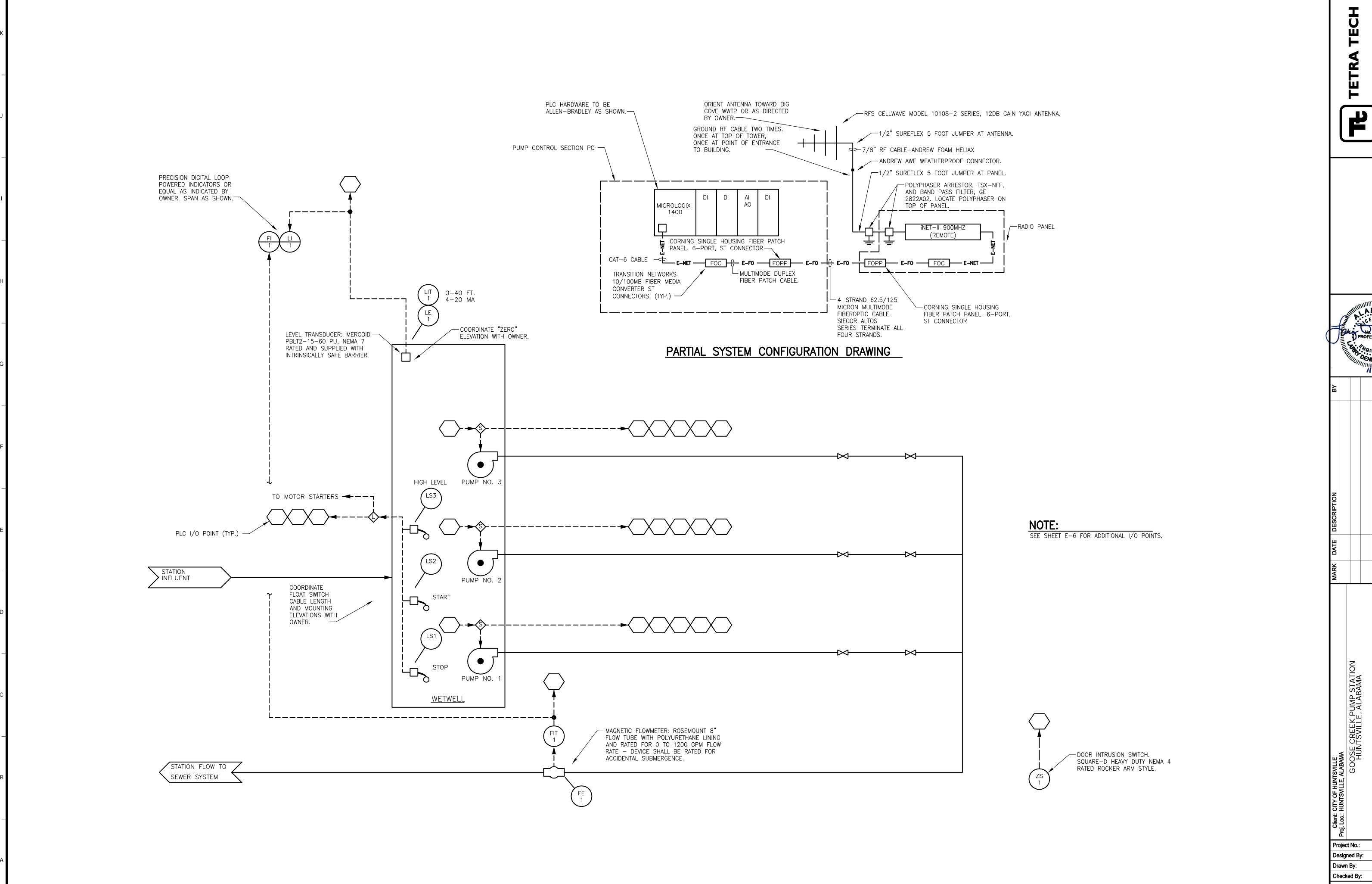
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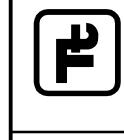
1. FURNISH TO OWNER ONE (1) SPARE SOLID STATE REDUCED VOLTAGE STARTER TO MATCH UNITS INSTALLED THIS CONTRACT.

ELECTRICAL ONE-LINE DIAGRAM Project No.: Designed By: Drawn By: Checked By:



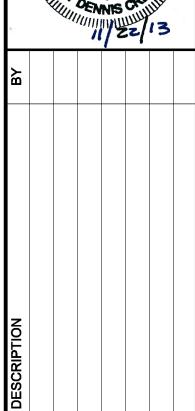




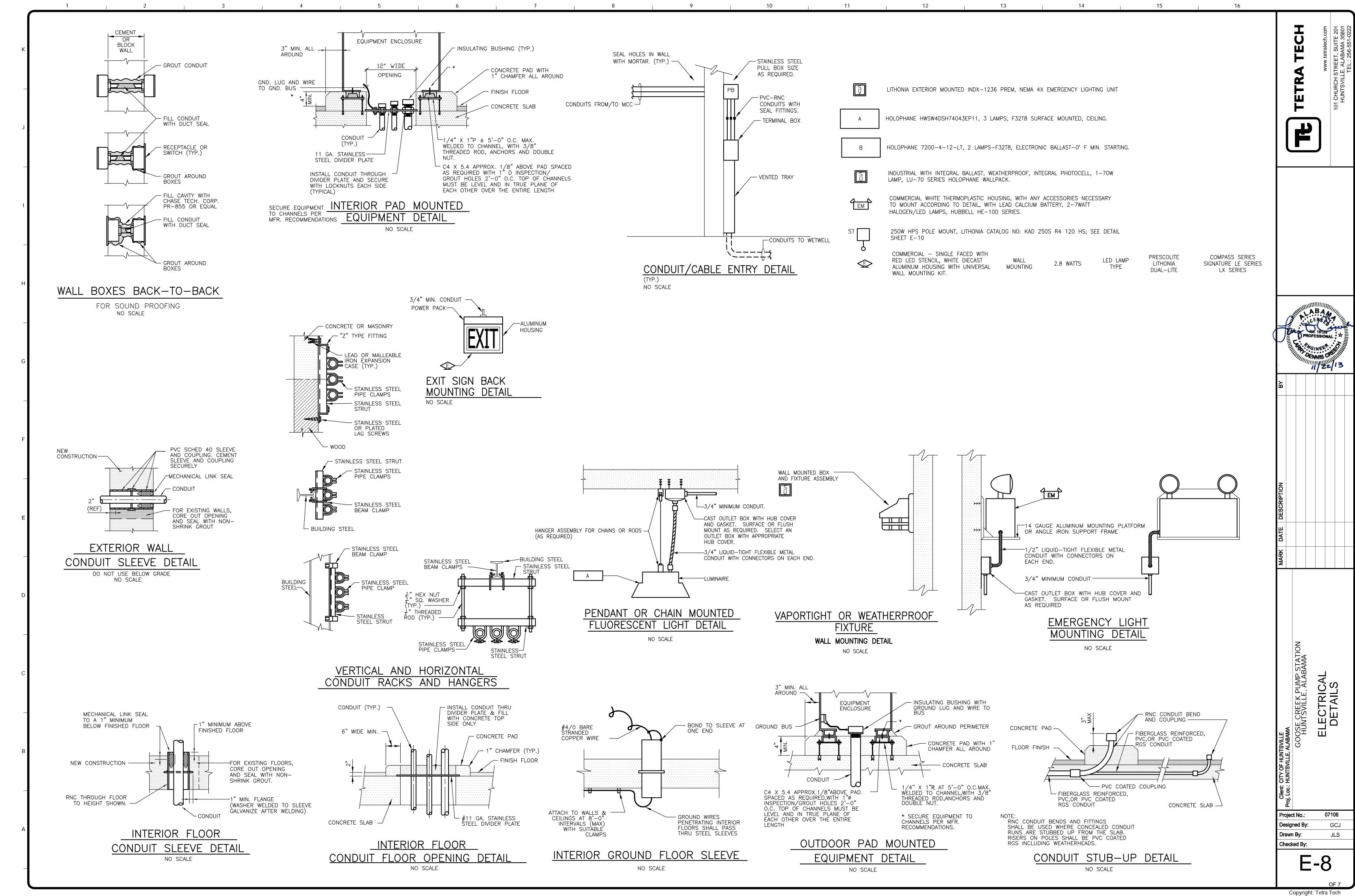


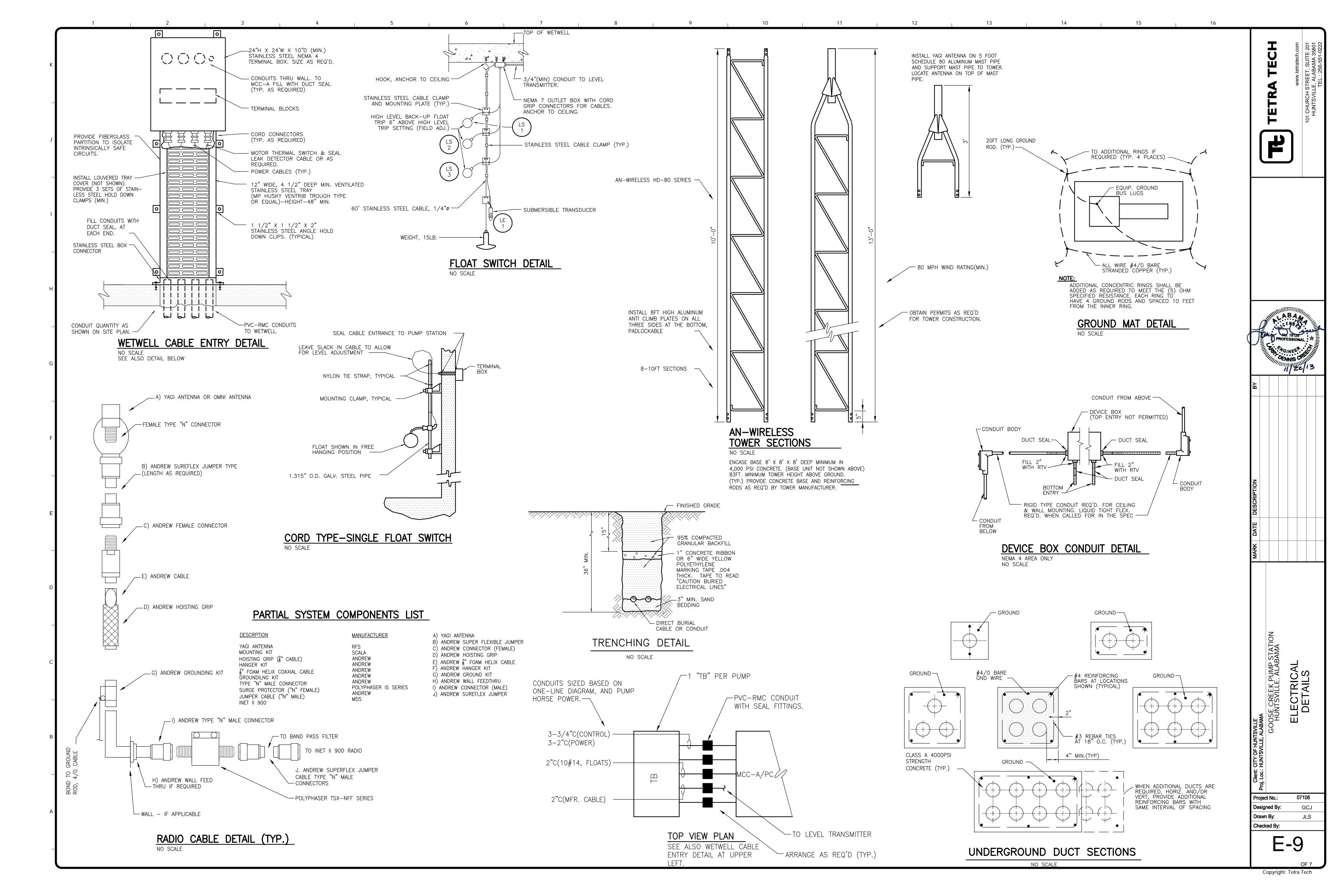
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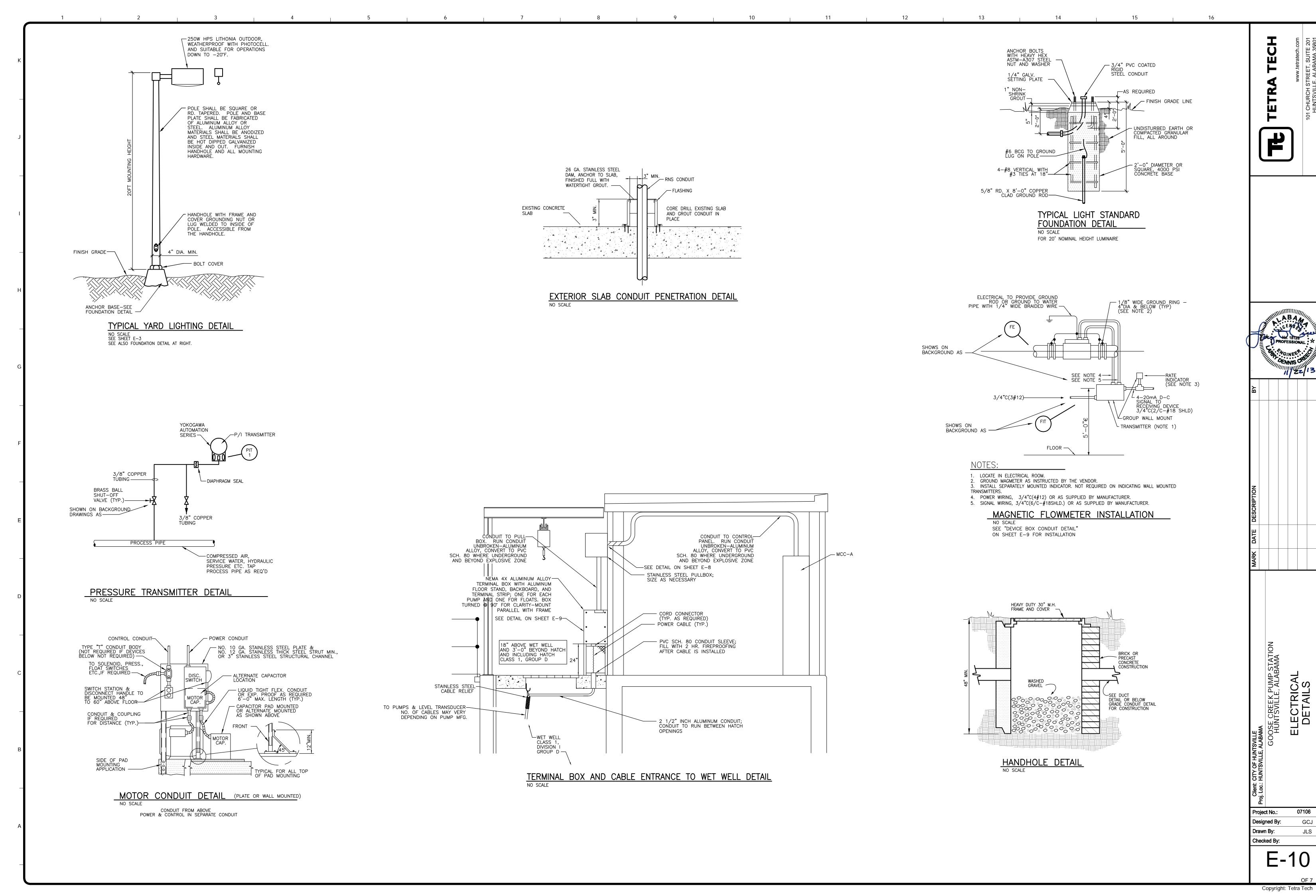




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ELECTRICAL DETAILS